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# An Address
ON
# CONCUSSION INJURIES OF THE VISUAL APPARATUS IN WARFARE. OF CENTRAL ORIGIN.

*Delivered at the Annual Congress of the Ophthalmological Society of the United Kingdom, May 5th, 1917,**

BY S. A. KINNIER WILSON, M.D., B.Sc. EDIN., F.R.C.P. LOND.,

ASSISTANT PHYSICIAN, WESTMINSTER AND NATIONAL HOSPITALS; NEUROLOGIST, FULHAM AND NAPSBURY MILITARY HOSPITALS; PHYSICIAN, LORD KNUTSFORD'S SPECIAL HOSPITALS FOR OFFICERS, ETC.

MR. PRESIDENT AND GENTLEMEN,—It is imperative at the outset to indicate as precisely as possible what type of case is to be assigned to the above category, for the whole subject of concussion and commotio is still surrounded with considerable obscurity, and looseness of conception is responsible for a certain amount of clinical confusion.

### CEREBRAL CONCUSSION AND COMMOTIO.

The difficulty is not lessened by the fact that the usual definitions of concussion and commotio do not command universal consent. Cerebral concussion is commonly understood to signify a violent shaking or jarring of the cranial contents without any structural lesions, and it seems certain that in some cases which have proved fatal the most painstaking investigation has failed to reveal any recognisable anatomical lesion. Yet the idea of a *morbus sine materie* is so repelling that to explain such cases a condition of "shock" is postulated, i.e., a reflex inhibition of certain cerebral mechanisms essential to life, or a condition of commotio, i.e., molecular concussion, producing the same result. Not a few writers, however—Kocher,[1] Page,[2] Thorburn,[3] Stolper,[4] Schmaus,[5] Hartmann,[6] and others—deny the reality of spinal or cerebral molecular concussion (commotio), maintaining on the contrary the impossibility of a severe or fatal cerebral or spinal affection without any definite anatomical lesion.

In most cases of severe blows on the head, as a fact, which have been diagnosed as concussion and which have proved fatal, examination has shown the presence of capillary hæmorrhages, minute lacerations of cerebral substance, and consequent disintegration of myelin, such as are sufficient to account for the clinical symptoms. Further, as Warrington[7] has remarked, and as any who have considered the subject must have realised, there is, with the blow, a sudden violent dispersion of cerebro-spinal fluid, which tends to escape too abruptly by the natural exits. Hence ensues a tearing of lymph channels and injury to the adjacent cerebral tissues.

In non-fatal cases, where the symptoms, though definite enough, have eventually cleared up completely, it is justifiable to assume organic lesions such as have been enumerated, which have not, however, been sufficiently widespread or serious to effect permanent impairment of cerebral function. For such cerebral conditions, where one has reason to suppose recognisable, if temporary, organic changes have occurred, it is preferable to employ the term cerebral contusion.

For the purposes of this paper, then, cerebral contusion may be taken to be the pathological basis of the condition known clinically as cerebral concussion.

Now, it does not appear practicable to draw a hard-and-fast line between such cases and those, slighter in degree, to which the term commotio—i.e., molecular concussion—may be applied. A knock on the "funny bone" produces a transient disturbance of sensibility in the ulnar distribution, as a basis for which we may perhaps postulate transient oscillations in the axoplasm of the nerve fibrils; whatever it be, we must imagine some change taking place. When the pressure of one limb on the popliteal nerves of the other results in the foot's becoming "asleep," we suppose a disturbance of function whose basis may be interruption of periaxonal or perineuronal lymph circulation. Let the pressure continue longer, as in, say, a crutch palsy, and we have an actual organic impairment of function which may take weeks to clear up. We call such a condition, *faute de mieux*, a pressure-"neuritis"; but the accuracy of the term, pathologically speaking, is problematical; indeed, whether any recognisable change could be determined microscopically is questionable. It is impossible to say in such a series of instances at what precise stage the term "structural change" may be fairly adopted, and the difficulty is not less in regard to cerebral commotio. Oppenheim,[8] in opposition to the other authorities quoted above, is unwilling to relinquish the conception of molecular concussion or commotio, although he rather admits that for him the conception does not exclude the possibility of such fine organic changes as alteration in capillary or lymph-channel walls, disintegration of the myelin in individual fibres, and so on. From the nature of the case, in the present state of knowledge the matter must remain in the realm of hypothesis.

While, then, the question of the actuality or otherwise of molecular concussion or commotio is still *sub judice*, and to some may be of mere academic interest, it should not be overlooked that from the clinical side it presents features of importance. In the course of the war there have come under my notice a large number of concussion lesions of the spinal cord of every kind, which may range from complete pulping of the cord at a given level, with dura mater intact and untouched, to a concussion such as reveals itself solely by transient symptoms of the type unfortunately termed "functional." Clinically there is, at the one extreme, a total motor and sensory paraplegia; at the other, the tremulous weakness, paræsthesiæ, and exaggerated reflectivity of "functional" disease. For practical purposes it is convenient and serviceable to divide cases into organic and "functional," but more than one case has come under my notice that has clearly been a sort of "missing link" between the two groups.† The evidence undoubtedly suggests that in certain cases so-called "functional" symptoms following immediately on spinal concussion are but the expression of an organic alteration minimal in degree and insufficient to result in the appearance of organic symptoms as ordinarily known. The significance of this will be seen subsequently in regard to the visual apparatus.

### EVIDENCE AFFORDED BY EXPERIMENTAL WORK.

Experimental work on the subject of concussion and commotio has been attempted to some extent, but it does not help to clarify our ideas as much as might have been expected. Schmaus[5] has demonstrated, in artificial concussion of the cord in kittens, swelling and degeneration of axones and fragmentation of myelin, without any gross pathological lesion. It has been shown that a blow upon the head of an animal may occasion this myelinic change in the fibres of the medulla, and even of the cord, presumably by dispersion of the cerebro-spinal fluid. Much the best and most scientific experimentation has been conducted by Alan Newton,[10] in the laboratory of the late Sir Victor Horsley. Newton allowed a glass rod, 8 mm. in diameter and weighing 50 gm., to fall upon the exposed spinal cord from varying heights, accuracy of direction being obtained by means of a glass tube, 1 cm. in diameter, through which the weight fell. So marked was the effect from heights of 40, 20, or 10 cm. that the height was reduced to 2 and finally to only 1 cm. The latter was a feeble blow, producing no visible effect on the cord, yet it completely abolished motor conduction for several days, both in the cat and the monkey. It is important, further, to note that a dissociation in conductivity was obtained, sensory conduction being still demonstrable, though motor inhibition was complete. The anatomical changes found in such animals were described by Newton as "trivial"; "they consisted of small hæmorrhages in the grey matter, usually in the basal region of the posterior cornua or in the posterior grey commissure, scattered swellings of axis-cylinders, and disintegration of myelin sheaths."

These experiments suggest that there is an organic basis for the transient disturbances of function seen in so-called "railway spine" and allied conditions of traumatic neurasthenia, and they bear out what has already been remarked, that "functional" symptoms may be the expression of minimal organic changes. They also prove the occurrence of a relatively surprising amount of tissue change from a feeble impact on the exposed cord, and show that the blow capable of producing merely a molecular concussion must be slight.

* THE LANCET, 1917, i., 814.

† In this connexion some cases reported by Elliott[9] are of interest.

### RARITY OF CASES OF PURE VISUAL CONCUSSION IN WARFARE.

When, from these necessary preliminary considerations, we pass to the question of concussion injuries of the visual apparatus in warfare, of central origin, we are compelled to the conclusion that a molecular concussion, or commotio, is almost certain to be of great rarity, for the simple reason that the impacts of high velocity projectiles, or even of shell fragments or spent bullets, are tremendous, to a degree far beyond that of the glass rod utilised in Newton's experiments. The shooting editor of the *Field* has written a letter on the subject, which is quoted by Musson[11] in his recent paper on the finer histological changes in the spinal cord following bullet wounds of the cord substance or shock to the vertebral column, and which contains useful information on the topic under discussion. It relates to the ·303 Mark VII. service bullet, weighing 174 grains.

Assuming that such a bullet strikes the body at 200 yards with 1000 foot-pounds energy, and is pulled up in 3 inches by the skin, muscles, and spinal column, the resistance offered by the tissues is on the average ..... 4000 lb. This 4000 lb., being the resistance offered by the tissues, may be regarded as the static pressure of the bullet acting against the tissues.

That an impact so tremendous should render the occurrence of a mere commotio practically an impossibility is not in any way surprising. And even though a bullet be spent or a shell fragment be pulled up by a steel helmet, the force of the blow must still be much beyond that which has often produced a concussion or commotio in civilian cases.

It will be seen, therefore, at once that while gross contusion lesions of the central visual apparatus are common enough, one may have to seek far and wide ere one can find a case which for the purposes of this communication may be admitted into the category of visual concussion, where, one may suppose, the organic disturbances are of the trivial nature that has already been described.

At Fulham Military Hospital and Napsbury War Hospital a large number of head injuries of all sorts have been referred to me; at the National Hospital and at Lord Knutsford's Special Hospitals for Officers, in addition to my own cases, I have had the opportunity, through the kindness of my colleagues, of going over a very considerable number of head cases with visual symptoms, and it may be said at once that only one case, described below, approaches the conception of an uncomplicated visual concussion, and even it is by no means free from objections. Two other cases to be quoted are instances of visual symptoms following blows on the head, but the mechanism of production of these symptoms is not that of concussion, and they are cited by way of contrast. After two and a half years one is still looking for a case where a direct blow on the head from any form of projectile, without gross wounding, has resulted in an uncomplicated visual commotio analogous to the cases of spinal-cord or peripheral-nerve commotio that have been, relatively speaking, common.

### CASES EXCLUDED FROM CONSIDERATION.

Let it be observed that all cases of visual disturbances from shell explosions *in the vicinity of* the individual concerned are purposely excluded. They belong to another group. Such are common and well known (see, for instance, Myers's[12] cases). I am not concerned to deny that violent dispersion of the air is a physical factor which may produce physical, i.e., organic, injury; on the contrary, two genuine cases of organic lesion of the spinal cord from shell explosions, without any outward mark, have come under my notice, and others (e.g., Ravaut[13]) have described similar examples. As long ago as the battle of Trafalgar, as Mahan tells, Nelson's clerk was "killed by the wind of a ball, though his person was untouched." Still more may such dispersion occasion transient disturbances of the kind we call "functional," though they may have some subtle organic basis underlying them. But obviously other factors, of a different class from those leading to commotio, come into play in such cases—"shell shock" is a complex resulting from several agencies. Further, it is difficult to imagine how visual impairment from "shell shock" could be of central origin, unless, of course, the patient, knocked over by a shell explosion, were to strike his head in falling. The peripheral visual apparatus is exposed, whereas the central apparatus is protected by the cranial box; it is the peripheral mechanism that must take the brunt of such "windage" effects. A consideration of the frequently accompanying phenomena of photophobia, blepharospasm, of "eyes burning," and so on, bears this out. To attempt to demonstrate the possibility of central defects by the action of diaschisis from peripheral concussion would be impracticable. Unless an exact history of a fall on the head from a shell explosion were forthcoming, the occurrence of central concussion from "shell shock" can scarcely be established. Personally, no such case has come under my observation, out of a very large number of cases of "shell shock."

Secondly, all cases of head wounds with resulting more or less permanent organic visual defects are excluded. Many cases of ordinary head injuries in the occipital region, with resulting scotomata and hemianopias of various kinds, have come under notice. Only a relatively gross organic defect in the form of loss of cortical substance, cortical or subcortical hæmorrhage, &c., will explain the condition, clinically, so that they do not belong to the concussion group. It is a matter of common observation that in the majority of such cases a period of practically complete blindness is the initial phase, much of which subsequently clears up. In Marie and Chatelin's recent paper,[14] for instance, it is noted, in passing, that most of their patients with varieties of hemianopic defect were blind for so many hours or days at the outset. Where, however, we have actual gross injury to the skull and intracranial contents, it is impossible to determine whether cortical laceration, or œdema, or subdural or subarachnoid effusion, or capillary oozing, or other obvious organic change, or merely a concussion or commotio, is the underlying factor for such symptoms as clear up completely. For this reason, if for no other, one cannot take severe head injuries into the class which forms the subject of this communication.

### CASE OF VISUAL CEREBRAL CONCUSSION OR COMMOTIO.

We are left, then, with cases where a blow on the head produces visual symptoms that tend to clear up, but does not result in a permanent hemianopia in any of its varieties or other type of organic symptom. Though the case about to be quoted admittedly does not come up to the proposed criterion it is the one least open to objection.

CASE 1.—Private A. B., aged 19, with a negative previous and family history, was wounded at 4 P.M. on Dec. 14th, 1916. At the time he was stooping down, cutting wood, in a little dug-out. He was hit on the back of the head, in the mid-line, just below the margin of his steel helmet, by a fragment of a shell and lost consciousness for, at the most, three minutes. He came to, to find a mate moving his right arm, which had also been hit and which was very painful; it was, perhaps, this pain which reached his sensorium and brought him round. At the same time he had racking pains all over the head, was very sick, and found he was completely blind in both eyes. He kept asking whether his eyes had been hit, as he could see nothing at all, only blackness everywhere. He remained thus blind for between 40 and 48 hours. On the third day he found that he was beginning to see dimly with both eyes, and trying each separately he found he could see a little with each. He saw a hand holding a medicine-glass, but nothing beyond that; such objects appeared very near him, but not altered in size—there was, in other words, no dysmetropsia with this defect in the appreciation of distance. The same afternoon he was operated on, and a small piece of loose fractured bone removed from the head wound; again, two days later, a second small splinter was taken out.

Towards the end of the first week, when his sight was improving, he frequently noticed a succession of faint, dark, shadowy forms and figures moving to and fro in front of his eyes, apparently. He never could make out quite what they were, except that they were always shadowy and dark with no colour in them. Sometimes they were still. He used to shut his eyes to get rid of them, but this procedure did not banish them, or, rather, sometimes it did and sometimes it did not. These subjective visual phenomena disappeared after about a fortnight. Of them the patient remarked that they always appeared smaller than reality, whereas objects seen in front of him were of normal size. Only the hallucinations were micropsic. It should be stated that at no time were the patient's eyes bandaged, nor was there at any time either photophobia or blepharospasm.

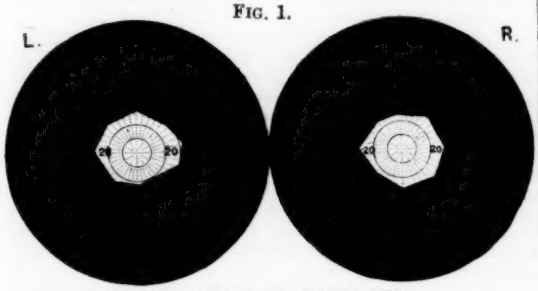
Very slow improvement took place, and when the patient came under my observation two months later his condition was as follows. The pupillary reactions were normal. The optic discs were normal with no indication of previous neuritis. There was no trace of any form of hemianopia or of scotoma, central or otherwise. Vision was R. 6/60, L. 6/60; Jaeger 14 R. and L. There was no headache, giddiness, or sickness. Careful routine examination of the nervous system revealed no abnormality except in regard to the visual fields. Here there was a concentric diminution of both fields, not quite symmetrical, both for white and colours, and also a marked condition of visual fatigue, so that excellent examples of a helicoid curve were obtained, in both eyes. This helicoid was present both for white and colours, and was rather flattened in a vertical direction. Bjerrum's screen was always used in testing.

The patient was re-examined at intervals during the next two months, the improvement continuing slowly. On May 4th his vision was R. 6/20, L. 6/15; Jaeger, R. 6, L. 4. The fields were distinctly better than before in the sense of being less constricted; the helicoids were again obtained. (Figs. 1, 2, and 3.)

The patient is still under observation.

As the X ray photograph shows, and the fact of operation indicates, we are dealing in this case with a lesion of undoubted severity, the outer table being splintered and the inner being cracked, and perhaps slightly splintered too. It is not to be denied that with such a lesion submeningeal effusion, or intracortical capillary hæmorrhage, or tearing of

FIG. 1.



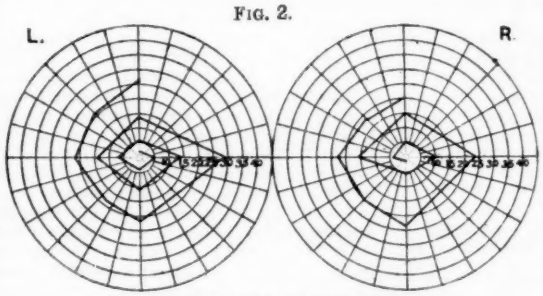

Fields for white in Case 1 (April, 1917).

lymph channels, or myelin fragmentation, are clearly possibilities to be envisaged. But, on the other hand, it must be borne in mind that the patient was unconscious for at the most three minutes, that there has been no evidence of intracranial pressure, that the absence of any form of scotoma or hemianopia is proof of the general integrity of the visual cortex, and that the visuo-psychic areas are similarly intact.

If, therefore, in the ordinary sense, there is structural integrity of the visual cortex, we are justified in associating the visual phenomena with the fact of a violent concussion over the occipital poles.

It is not forgotten that when bullets are directed against water-containing mediums, as the shooting editor of the *Field* states, they set up a hydraulic force which acts radially through the mass. The brain, however, does not respond exactly as a water-containing medium, and the reaction to a blow is not uniformly distributed throughout its mass. As Warrington says, it is most intense at the point of application and in those parts of the brain opposed to fixed points—the points of *contre-coup*. Now, in the case under consideration there is no clinical evidence to suggest a condition of *contre-coup*; hence the conclusion above stated appears to me inevitable.

FIG. 2.




Spiral fields for white in Case 1 (May 4th).

### REASONS FOR NOT REGARDING THE CASE AS TRAUMATIC HYSTERIA.

An objection of another kind must next be considered. It may be said this is merely a banal case of traumatic hysteria, as helicoid and concentric diminution of the visual fields were described long ago in that neurosis and have been supposed to be pathognomonic of it. (By the way, it may be worth remarking that the existence of helicoid fields in hysteria is one of those typical statements which are copied from one text-book to another in uncritical fashion and which may be found to have little satisfactory clinical support. None of the more modern works on hysteria contain any fresh clinical instance of the condition, while some authorities do not even refer to it. It is, in short, a matter which calls for re-investigation.) But against this contention several arguments may be raised.

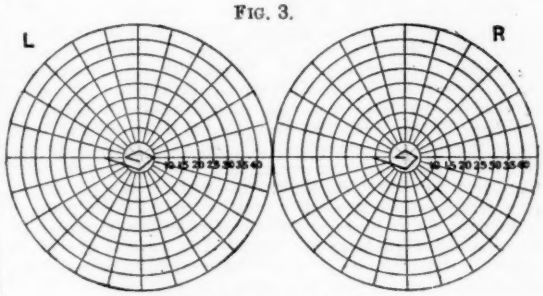
1. With the exception of the visual symptoms no impairment of function of the nervous system was discovered. Were the case, then, one of hysteria, it must fall into the category of monosymptomatic cases, which in ordinary experience are rare, but do nevertheless occur. Now concentric diminution of the visual fields has never been described as an isolated phenomenon in hysteria. Personally, I have never seen an instance of this visual defect in hysteria unaccompanied by cutaneous anæsthesia. This is in agreement with the findings of Voss[15] in his monograph, and Féré,[16] Wilbrand and Saenger,[17] and others have also stated that concentric diminution of the fields is found only in cases with some form of anæsthesia elsewhere. In face of this opinion the contention that the case is hysterical is seriously weakened.

2. The war has afforded proof, over and over again, of the fact that an interval of hours or days intervenes between the shock-producing stimulus and the development of a traumatic psychoneurosis such as hysteria. The French say "there is no hysteria in the firing line"; time must elapse, though it be measured but by hours, for subconscious complexes to be formed—"une période de méditation" is necessary, a subconscious rumination. Instance after instance of the action of this mechanism has come under my notice; it is, in fact, almost a commonplace. Now in the case under consideration the patient was struck on the back of the head, was unconscious for three minutes, and regained consciousness to find himself completely blind. In 48 hours he was beginning to improve. Being ignorant of the details of cerebral anatomy, he thought his eyes had been hit. In view of these circumstances it is maintained that to attribute his symptoms to post-traumatic auto-suggestion or other subconscious activity is unjustifiable and erroneous. The condition is physiopathic and not psychopathic.

That traumatic neurasthenic symptoms may immediately succeed a shell explosion or a direct injury, such as being buried, is recognised by all who have been working on the neurological side of the injuries of warfare, but a distinction must be drawn between neurasthenic manifestations and hysterical manifestations. Restriction of the visual fields and helicoid curves, without being in the strict sense pathognomonic, are characteristic of the latter condition. Instead, therefore, of regarding the case as one of traumatic hysteria of the monosymptomatic variety I hold that we are dealing with a true cerebral concussion, or commotio, affecting the visual system, and some at least of its value consists in the light which it throws on the mechanism of production of so-called "functional" phenomena. That is to say, so far from hysteria mimicking organic disease in this case—a process which Charcot and his pupils maintained was of common occurrence—we have here an instance of organic disease—for a concussion is an organic state—mimicking hysteria, where the symptoms produced by a violent blow, without, presumably, any gross structural change, simulate, though they are not identical with, those produced by subconscious activity.

A generation ago Hughlings Jackson asked what are the symptoms of "functional" disease of the cerebellum, and the question remains unanswered. Of the "functional" diseases of other intracranial mechanisms we are equally

FIG. 3.




Spiral fields for red in Case 1 (May 4th).

ignorant. It may be that to put the matter in this light will evoke the response that all symptoms are "disturbances of function," and that to try to distinguish between "functional disturbances" and "disturbances of function" is a mere quibble. So much the better. I believe this case may

be taken to suggest that in certain cases the outward manifestations of a minimal organic disturbance are of the type hitherto supposed to be characteristic of "functional" disease. It becomes matter for discussion whether the "shock" of a concussion may not effect a change in cortical bio-chemical activity the expression of which is comparable to the "functional" disturbance called hysteria.

### CASE OF TRAUMATIC HYSTERIA.

By way of contrast, a case may be selected where, notwithstanding head injury and cerebral concussion amounting perhaps to contusion, the visual symptoms are, in my opinion, derived from another source.

CASE 2.—Sapper C. D., aged 44, was wounded at Neuve Chapelle in March, 1915. When walking down a path from the village to the trenches he was struck by fragments from a shell which exploded in his immediate vicinity, and fell unconscious. He does not remember anything till his arrival in hospital, two days later, and it is not known whether he remained unconscious all that time. He was wounded in the forehead above the right eye, the frontal bone being splintered, and above the right ear, where, apparently, the bone remained intact; there was a cut on the left upper eyelid and dirt in the left eye. When he came to he found the left eye bandaged, while the right was free. The bandage remained on for some ten days, and when it was permanently taken off he discovered that he could not see with the left eye, while the right was normal. With the left eye everything was "a blur of golden light," "like a sun with its rays pointing out in all directions," so that he could distinguish nothing. The visual condition remained unchanged till six months ago, when he noticed he could see out of a small area in the upper and outer field on the left side. This has not apparently enlarged during these six months.

On examination in March, 1917, the actual condition of the left eye was seen to be normal in all respects. The pupil reactions were normal on the two sides. The optic discs were normal and identical in colour. The double prism and "friend" tests unfortunately both proved unsatisfactory, mainly because they had been tried before and because the patient's answers were non-committal and obviously not frank. However, he was found on further examination to be "deaf" in the left ear and anæsthetic to pinprick over the left half of the body and limbs, including the left half of the tongue. (It should be added that two sisters of this patient's mother were at one time in an asylum, and both died there.)

In this case, conceivably, we are dealing with a concussion effect on the left peripheral ocular mechanism, but in view of the other symptoms it is to be placed in the category of traumatic hysteria. Notwithstanding the genuine cerebral concussion produced by the head injuries the mechanism of development of the blindness is of a different kind altogether from that of the first case.

### CASE OF SO-CALLED "SUBCONSCIOUS MALINGERING."

Another case may be selected.

CASE 3.—Private E. F., aged 45, was sniping from the trenches at Zonnebeke one evening in September, 1915, when he was hit on the left side of the head and face by fragments of what he maintains was an explosive bullet, which struck some object only a few inches away from where he was standing. He fell unconscious, and remained in that state for about one hour. On coming round he discovered he was blind in both eyes, and remembers that he noted this at a time when the bandages which covered both eyes were temporarily removed. On about the tenth day after the wound the bandage was permanently taken off the right eye, and he found vision with that eye was normal again. The left eye remained covered with a shade for some more weeks, and when it too was removed he declared he was quite blind in the left eye still, and he has remained so ever since.

On examination in March, 1917, the left eye was seen to be normal in all respects, with normal pupil reactions. The optic disc was normal and identical in appearance with the right. No defect of any kind was discovered in the nervous system, either organic or "functional." With the double prism and the "friend" tests the patient was completely caught out, and the nature of his visual condition at once demonstrated.

Here, again, in spite of the general cerebral concussion, unconsciousness, and immediate blindness, the persisting visual defect is clearly seen to be of the nature of so-called "subconscious malingering." Whether the blindness noted at the outset was a concussion phenomenon is questionable, in view of the facts that the patient was not struck on the back of the head, and also that he knew he had been hit in the face and round the left eye, was told there was dirt and sand in both eyes, and remained with both bandaged for some ten days. To exclude the possibility of a peripheral concussion would be more difficult, and it is conceivable we have here a hysterical symptom erected on an existing slight organic basis. The case is quoted to illustrate this difficulty in determining whether a persisting symptom is an original symptom, as well as the further difficulty of assigning relative importance to the more or less synchronous actions of more than one etiological factor.

### EFFECTS OF CEREBRAL CONCUSSION.

Some considerations arising out of the subject deserve a little attention.

It may be taken as axiomatic that every case of head injury from gunshot wounds of any kind in warfare must be associated with cerebral concussion, whether it be a cerebral contusion or something considerably less in degree. The immediate effects of concussion are generalised, in the shape of, *inter alia*, unconsciousness. The sequelæ may be localised or generalised, or both. Among the latter are headache, asthenia of cerebral type, not infrequently "cerebral irritation" as revealed by profound restlessness, inattention, and irritability.

More interesting for our purpose are localised sequelæ. Some special function of the brain may be permanently lost or impaired—e.g., a localised retrograde amnesia has not seldom been observed. Moutier[18] has recently published a record of his investigations of labyrinthine impairment of function after cerebral concussion from head injuries in warfare. In a series of 46 cases of gunshot wounds of the head no fewer than 40, i.e. 87 per cent., showed evidence of labyrinthine concussion or defect of function on objective examination, independently of the site of the injury. That so high a proportion is reached can be understood from the situation of the labyrinth, embedded in the bony framework of the cranial box.

This raises the question of the relative vulnerability to concussion of the special sense systems of the cerebrum. I have no data for taste and smell, but as far as the others are concerned, in my experience visual impairment after generalised cerebral concussion is much rarer than labyrinthine impairment, and certainly rarer than auditory impairment. It is interesting to note in this connexion that Mott[19] finds in his experience of "shell shock" cases that defects of vision are relatively uncommon as compared with deafness and hyperacusis. Probably the anatomical situation of the central visual apparatus acts as a protection, while for the same reason as the labyrinth the peripheral auditory mechanism is prone to be concussed wherever the actual head injury be.

### INTERPRETATION OF VISUAL PHENOMENA IN CASE 1.

The question of the interpretation of the visual phenomena in the first case quoted is of considerable importance. The view here put forward is that symptoms usually held to be "functional" in type may be the expression of a direct visual concussion, undoubtedly an organic condition. These symptoms are concentric restriction of the visual fields and the occurrence of helicoid or spiral fields with certain tests.

1. In regard to the first of these, it must be borne in mind that such concentric diminution, supposed to be characteristic of hysteria, does certainly occur from head injuries. In the series recorded by Marie and Chatelin[14] there are two cases where the visual fields are almost identical with those obtained at the first examination in my case. In these two, however, "il s'agissait de traumatisme grave de la région occipitale atteignant les deux sphères visuelles." In many other cases, as has been already remarked, an occipital head injury is ushered in by general blindness for some days or hours: "Le syndrome de la cécité corticale relevait chèz ces blessés de commotion ou de compression de tout le territoire visuel cortical, non de destruction étendue comme dans les deux cas." Marie and Chatelin therefore regard the general blindness as due to compression or commotio, whereas by implication the constricted fields of their two cases have a different origin. In each case the patient was blind for many months, and macular vision was the first to return. Whatever be the explanation—and the authors do not venture on one—the important point is that such fields are clinically indistinguishable, as far as constriction is concerned, from those of hysteria. There is no mention of subconscious vision over the rest of the field, and it may confidently be assumed that the two patients showed none of the usual phenomena of hysteria.

Again, in the series published by Lister and Holmes[20] there is one (their Case 20) where the patient was shot through the head from side to side, above and behind the pinnæ. "Six weeks after the infliction of the wound he could only read large letters, and his visual fields were limited to a zone of about 10° around the fixation point. He was able to recognise colours by macular vision." There is no mention or suggestion of hysterical symptoms, and, of course, the organic nature of the lesion is undoubted, it being fairly certain that the optic radiations were injured. The authors state that in their opinion "the interpretation of his visual disturbance is doubtful." Here, once more, is an organic case with a visual defect of constricted fields, as in hysteria.

My case is a fourth, therefore, where a moderately severe organic lesion in the occipital region is followed first by general blindness, and subsequently by concentric diminution of the fields, in a marked degree; and, like these others, with no trace whatever of any symptom of the hysterical psychoneurosis. It differs from Marie and Chatelin's cases in the short duration of the blindness; in fact, it is a very much milder case as far as general symptoms are concerned. Lister and Holmes say that "telescopic vision" is "not uncommon in patients who have been shot through the head in the lower parietal or temporal regions," and the above case is quoted by way of illustration. They do not, however, make any suggestion as to the pathogenesis of the condition in these cases.

By way of contrast, in regard to this one point, a case recorded by Eisdell Moore[21] may be quoted. The patient was shot through the back of the head from side to side, and was at once totally blind. On the seventh day he could distinguish "large objects"; on the tenth he could count fingers (distance not specified); on the fifteenth "there was some limitation of the right field of vision." Within three weeks his fields of vision were "normal." Unfortunately, perimetric examination was not practicable. The author's comment is: "From the rapidity of recovery it is evident that blindness was due mainly to concussion, yet it seems extraordinary that a bullet could pass through both occipital lobes without causing some permanent interference with vision." It is possible, however, that a bullet might pass through the occipital lobes without injuring either the optic radiations or the area striata. Notwithstanding the incomplete record this is a case of direct occipital jarring without notably constricted fields, and without doubt most workers on the subject have seen analogous cases.

From what has been said, then, it must be conceded that in certain cases of organic injury of the central visual mechanism, by concussion or otherwise, the result is constriction of both fields, occurring by itself and without evidence of subconscious vision in the remainder.

2. I have not been able to find any reference to helicoid fields in recent war literature with the exception of a comment by the late Mr. Jessop[22] at the discussion on Shell Shock without Visible Signs of Injury at the Royal Society of Medicine. Jessop there stated he had had under his care numerous cases of temporary blindness following the explosion of shells. "The blindness lasted under a week, and generally about two or three days. Both eyes were always affected, the pupils were active to light, and the ophthalmoscopic appearances normal. The fields of vision were sometimes contracted, but more often normal: in only two cases did I find a spiral field." It is to be regretted that more details were not recorded, especially as it is not clear exactly what explanation Jessop gave of their occurrence. He said that "the windage of the shell, or in some cases *the actual blows from falling down or violence* (italics mine) affected the cortex cerebri." If this were so in the two cases specified, then undoubtedly they had for basis an organic condition, presumably a cerebral concussion or commotio (the discussion dealt solely with cases without visible injury). In the absence of further information it is idle to speculate, but the assumption is perhaps justifiable that Jessop inclined to a view of their development which was not the ordinary theory of traumatic hysteria.

The difficulty that surrounds the subject will be obvious to the reader. Under what circumstances certain side-to-side injuries of the back of the head produce constricted fields is not known‡; why my Case 1 shows the condition in typical guise, while other occipital lesions that have come under my observation, by no means dissimilar in extent or site, are not followed by such clinical symptoms, is far from clear. For the present, it appears a reasonable contention that in certain cases without permanent visual defect of the accepted organic type of hemianopia or scotoma constriction of the fields, and helicoid or spiral fields, may be the expression of an organic change, the basis of which is a violent commotio, or a concussion amounting to contusion, of the visual cortex or some part or parts of it not more closely to be specified, or of the subcortical visual projection system.

‡ Sir William Gowers held there was clinical evidence to suggest that lesions in the neighbourhood of the angular gyrus might produce amblyopia and some restriction of both visual fields, more marked in the contralateral eye, but his views have not received much support.

(*Continued at foot of next column.*)

# ON SKIN-GRAFTING: A PLEA FOR ITS MORE EXTENSIVE APPLICATION.

By S. R. DOUGLAS, M.R.C.S., L.R.C.P. LOND.,
CAPTAIN, I.M.S. (RETIRED); FIRST ASSISTANT, BACTERIOLOGICAL DEPARTMENT, MEDICAL RESEARCH COMMITTEE, NATIONAL INSURANCE ACT;
L. COLEBROOK, M.B., B.S. LOND.,
CAPTAIN, R.A.M.C. (T.); ASSISTANT, BACTERIOLOGICAL DEPARTMENT, MEDICAL RESEARCH COMMITTEE;
AND
A. FLEMING, M.B., B.S. LOND., F.R.C.S. ENG.,
ASSISTANT, BACTERIOLOGICAL DEPARTMENT, MEDICAL RESEARCH COMMITTEE.
(*From the Inoculation Department, St. Mary's Hospital.*)

IT has long been recognised that after the first phase of acute bacterial infection has been satisfactorily passed, the treatment of wounds should be directed to the rapid closing of any cavity and the covering of the surface with epithelium, rather than to the killing of the bacterial flora which was the original cause of the suppuration. As illustrating the futility of attempting to keep an open wound sterile, Wright, in a recent lecture, instanced the case of burns, which, although usually at first sterile, invariably become infected later and are notoriously prone to troublesome sepsis. The importance of obtaining the rapid healing of wounds might be urged on many other grounds, some of which are so apparent as scarcely to call for mention, such as the reduction of the period of invalidism, the prevention of contractures, and the rapid restoration of function.

It will be generally agreed that the ideal procedure for this purpose is along the lines of plastic surgery; for instance, by the operation of secondary suture, or the more conservative method of drawing the edges together with adhesive plaster—the "dry suture" of the eighteenth-century surgeons.

*Healing Process of Wounds: Neglect of Skin Grafts.*

Most suppurating flesh wounds when treated effectively from the beginning pass after a period of one to three weeks of acute sepsis into a clean, "raw meat" stage, in which the tissues are found to be loose and supple, the surface covered with a thin layer of healthy granulations, and the bacterial flora remarkably sparse. At this stage secondary suture has, in many surgeons' hands, proved a most successful operation, extensive wounds having healed almost as if by primary union. This stage, however, is but a short one, and if operation is deferred the conditions present in the wound become much less favourable for successful suture. Cicatrisation having progressed rapidly, the tissues have become bound together and have lost their elasticity, so that it is necessary to put considerable tension on the sutures in order to bring the edges of the wound together. Further, the granulations have frequently grown redundant, leading to an increased outflow of pus and a much more abundant bacterial flora.

Many other wounds do not lend themselves to the methods of plastic surgery in consequence of the extensive loss of skin entailed by the original injury or as the result of subsequent operations undertaken to check gas infections, &c. The healing of the wounds, which, for one reason or another, are not closed at an early stage—and at present they constitute the majority of the cases—takes the tedious course familiar to all surgeons, and is particularly liable to be very protracted in its later stages.

It is not proposed here to deal with the treatment of wounds left to heal by natural processes, except in so far as

(*Continued from preceding column.*)

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to call attention to a point not perhaps generally recognised—viz., that the troublesome later stages of extensive flesh wounds, especially those complicated by considerable loss of tissue, may be frequently hastened by vigorous and repeated massage of the hard, tough mass of cicatrix.

In theory, at any rate, it ought to be possible to cut short this tedious stage of the healing process by the application of skin grafts, yet the operation seems to be commonly regarded as a last resort and is comparatively seldom practised; for, since the commencement of the war, only two short contributions to the subject have appeared in the *British Medical Journal*, and in *The Lancet* a single (although very important) letter.

On inquiring into the cause of this neglect the following factors suggest themselves:—

1. *The uncertainty of the method.*—In many surgeons' hands failures have been at least as frequent as successes, and, even when the grafts have taken, the resulting scars have been thin, weak, and prone to ulceration.

2. Anxiety to spare the patient both the immediate misery of a general anæsthetic, as well as the prolonged and serious discomfort associated at times with the healing of the raw surface from which the grafts were taken. Not unfrequently, owing to suppuration having occurred in this area, it has taken longer to heal than the wound or ulcer which was (perhaps unsuccessfully) grafted from it.

The aim of the present communication is to suggest that both these considerations may be ruled out and that the operation of skin-grafting can be placed in the position of a simple, reliable procedure worthy of very wide application in surgery. It may be boldly said that the uncertainty of the method is very largely due to imperfections of technique—in particular the technique of the after-treatment.

The literature of the subject is almost entirely occupied with recommendations of one or another type of graft and the results obtained when the operation has been successful, but very little has been written as to the conditions and causes leading to success or failure. Before discussing these latter it will be of advantage to give a synopsis of the history of skin-grafting.

### *Historical Synopsis: Reverdin's Method.*

For almost all the original work on the subject it is necessary to look back to the period of 1870–86. Whether it originated during the Franco-German War is not clear, but, at any rate, interest in it was first aroused in Paris by the publications of J. L. Reverdin, who having observed the growth of epithelium around islets occurring spontaneously on granulating surfaces, sought to multiply such centres of growth by transplanting small epithelial grafts. These grafts he obtained from the skin over the tibia by the following procedure: Holding the skin in this situation tense, the point of a rather large bleeding lancet was thrust into the dermis, and keeping the blade as nearly as possible parallel to the surface, the point was made to emerge at a distance of 3 or 4 mm.; on continuing the pressure the small piece of skin was effectively detached by the cutting edges of the lancet.

Although commonly spoken of as "epidermic grafts," Reverdin's important communication of 1872 makes it clear that they included, at any rate at their centre, portions of the dermis, which, however, in his opinion, did not become adherent until much later than the larger epidermic portion of the graft.

Reverdin's success with these small grafts appears to have been considerable, and in the paper referred to above he summarises his experience derived from more than 50 cases, together with the publications of surgeons in different countries who had followed or modified his methods. In this paper it is shown that, at this time, grafts taken from another individual had been successfully transplanted, as was also the case when the graft was taken from a negro or an amputated limb. Moreover, the important observation had been made that if a graft was placed near the edge of the wound, or if two grafts were placed close together, a bridge of epithelium was very rapidly formed between their nearest points, whereas the epithelial border around isolated grafts, placed at a distance from the edge of the wound, extended much more slowly, tended to remain circular, and as a rule did not grow beyond the size of a sixpence.

Another remarkable feature of the epithelial islands which developed from Reverdin grafts was their comparative resistance to the morbid changes prone to occur in healed ulcers. Several cases were recorded in this paper, and also others by English surgeons, in which the breaking-down of scars involved all the epithelium formed from the margins of a wound but spared that in the immediate neighbourhood of former grafts. With this in view Reverdin suggested that many more grafts than were generally employed might be with advantage placed on the granulating surface.

As regards histological observations, the most important were made at a somewhat later date by Thiersch, who transplanted Reverdin's grafts on to a limb at varying intervals previous to its amputation. He was able to determine by injection of the main vessels of the amputated limb that vascularisation of the graft had already commenced within 18 hours of its being transplanted on to a granulating surface.

### *Modifications of Reverdin's Method.*

Although Reverdin does not appear to have departed from his original method, other surgeons were not slow to attempt modifications of it. Nelson Dobson, of Bristol, with the idea of making the small epidermic grafts go farther, cut them up on his thumbnail into five or even ten fragments, thereby hoping to multiply the centres of growth. He also, with the view of giving such minute fragments a better chance of "taking," inserted them into small incisions made in the granulations.

The "section grafts" described a little later in the present paper represent a further development of Dobson's procedure.

Fiddes, of Aberdeen, and Marc Sée, of Paris, carried the idea of economy still farther, their procedure being to sow the granulating surface with the tiny collection of cells obtained by merely scraping an area of skin. This method of "epithelial sowing" may be of theoretical interest, but the resulting scars would probably be of the worst type.

With the exception of these two methods all the important modifications of Reverdin's operation have taken the direction of larger grafts.

Several of the English surgeons (who were first to follow Reverdin's lead) preferred forceps and scissors (or scalpel) to the bleeding lancet for removal of the grafts, with the result that these tended to be larger and also thicker than the thin, mainly epidermic, type recommended by Reverdin. These somewhat larger grafts were found to adhere just as readily on a satisfactory surface as the smaller ones, and it was pointed out by Steele, of Bristol, that when treating ulcers which, after healing, would be subjected to great strain and likely to break down, it would be advantageous to transplant a number of fair-sized portions which would certainly retain their elasticity, and so by their individual stretching relieve the tension of the whole surface. This surgeon speaks of his grafts as including the whole thickness of the true skin but none of the fat and areolar tissue, their size varying from that of a large pea to a threepenny-piece, or occasionally even larger. Such grafts were manifestly very different from Reverdin's, and although their actual dimensions would naturally vary slightly in practice it would seem justifiable as well as convenient to use the term "Steele's grafts" in referring to this type, as the present authors will have occasion to do. The fact that these grafts were not generally adopted, and so came to be forgotten, may well have been due to the pain caused by cutting them. The same consideration was probably responsible for the fact that all grafting operations in those days were of very modest proportions—more than ten grafts at a sitting being rarely recorded, the more usual number being three to six.

When, after a few years, anæsthesia came into more general use, Wolfe, of Glasgow, employed what were in reality very large Steele grafts for correcting severe ectropion, &c. What constituted this method a new procedure was really the idea of covering the entire surface to be grafted rather than establishing centres of growth. For this purpose Wolfe dissected off from the patient's arm a piece of skin of the required size—up to 2 or 4 square cm.—carefully avoiding the fat and areolar tissue. In this last detail his flap grafts differed from those which had been employed in India during the eighteenth century.

A later paper by Wolfe suggested that this method might have a wider application in surgery, but it was not apparently taken up until 1893, when Krause put forward the view that such grafts would furnish stronger and more elastic

scars than those resulting from Thiersch's method, which had at that time been in favour for several years. Success, however, seems to have been limited to cases in which the grafts were transplanted on to aseptic wounds, and Wolfe's method has never come into general use for covering granulating surfaces.

*Thiersch's Mode of Skin Grafting.*

Thiersch's procedure, described by him in 1886, resembled Wolfe's in that it aimed at covering the whole surface to be grafted, but in respect of technique was quite different, the grafts being cut very thin by means of a razor, including only epidermal tissues, and being planted, not directly on the granulations, but on the raw surface from which these had been previously pared away. With the exception of this latter practice of paring away the granulations, Thiersch's method has been more extensively employed than any other during the past 30 years, the work of Reverdin and his followers being almost forgotten. A general anæsthetic, however, has almost invariably been considered necessary for cutting Thiersch grafts, and this circumstance has gone far towards limiting its application to the treatment of very large granulating surfaces. (The need for a general anæsthetic may, however, be called in question, Nystroem, Laewens, and others (1909–1911) having reported that they obtained satisfactory anæsthesia by nerve blocking with novocain, while more recently Pearce Gould and Archer have advocated infiltration anæsthesia for this purpose.)

It will be pointed out later that the uncertainty of results obtained by Thiersch grafting has been chiefly due to imperfections in the technique of the after-treatment, but the large size of these grafts may well be an additional special factor, for, covering as they do a considerable area of granulations with many pits and crevices, they tend inevitably to imprison the discharges, which, by liberating tryptic ferments, digest not only the epithelial outgrowths but ultimately also the actual grafts. To prevent this disaster it has sometimes been recommended that holes should be punched in the grafts.

Other disadvantages of the method have already been mentioned above—namely, the possibility of troublesome sepsis during the healing of the large raw surface from which the grafts were taken; and, finally, most important of all, the inelastic, vulnerable character of many of the resulting scars.

In recent years there has been, in America at least, a return to Reverdin's method, the claim being made by Cotton and Ehrenfried (1909) and by Davis (1914) that, except in cosmetic effect, this procedure gave better and more certain results than Thiersch's method. The grafts employed by these surgeons were obtained by under-cutting with a scalpel little pimples of skin raised on the point of a needle. In size they did not as a rule exceed 3 mm. in diameter, larger grafts being considered less satisfactory.

*Viability of Skin.*

Lastly, it is necessary to refer to a very important and original communication by Carrel in 1912. He obtained a number of grafts, consisting of the whole thickness of the skin without any of the underlying fat and areolar tissue from a healthy fœtus, which had died during labour, and preserved them in liquid paraffin at + 3° C. After 42 days he found the skin to be normal in appearance, both macroscopically and microscopically, and even after six months their appearance had not markedly changed. At intervals their viability was tested by transplanting portions on to granulating surfaces, with the result that, even up to seven weeks after their removal, some of the grafts "took."

Although, as pointed out above, it has long been established that grafts from one individual may be successfully transplanted, the general experience has been that they are not as a whole so satisfactory as autodermic grafts; notwithstanding this, Carrel's findings, if confirmed, open up new possibilities.

*Description of Authors' Method.*

The routine procedure worked out by the present authors may now be described in full, since it differs in several respects from the methods usually adopted in the past, the difference tending, it is hoped, towards simplicity and more constant results. The grafting operation, including the method of obtaining local anæsthesia, will first be dealt with; secondly, the after treatment; and, finally, the results obtained.

*Anæsthesia.*

Local anæsthesia induced by blocking certain nerves of the thigh with novocain has been almost invariably employed. If an insensitive area of only moderate size is required the external cutaneous nerves alone are blocked, and about 15 minutes later some 20 to 30 Steele's grafts may be taken without the patient suffering any pain from an oblong area of skin usually about 12 by 20 cm. in measurement situated on the antero-external aspect of the thigh. (Fig. 1, A.) If a larger anæsthetic area is required the anterior crural nerve is also blocked, when the area shown in Fig. 1, B, is rendered insensitive. The technique employed has been substantially that of Nystroem and Laewens; a 2 per cent. solution of novocain with a small amount of adrenalin (1 in 50,000) is the anæsthetic used.

FIG. 1.

The area A represents the size of the anæsthetic patch obtained by blocking the external cutaneous nerves. When the anterior crural nerve is also blocked the further area B is rendered anæsthetic. (The anæsthetic area below the knee has not been indicated as all the grafts have been taken from the thigh.) At C is indicated the point of insertion of the needle for blocking the external cutaneous nerves and also the area to be infiltrated. At D is indicated the point of insertion of the needle for blocking the anterior crural nerve.

To block the external cutaneous nerve the needle is introduced a little below and to the inner side of the anterior superior iliac spine; the tissues both above and below the deep fascia are now infiltrated, the needle being thrust downwards, inwards, and also outwards from the point where it was inserted. The area thus infiltrated is indicated in Fig. 1, C. About 5 c.c. of the novocain-adrenalin solution is used.

The blocking of the anterior crural nerve is much more difficult and requires a strict attention to anatomical landmarks. It will be found an advantage to mark out with a skin pencil (i.) the line of Poupart's ligament, (ii.) the common femoral artery, which enters the thigh midway between the symphysis pubis and the anterior superior iliac spine, and (iii.) a point, barely 1 cm. outside the artery and midway between the spine of the pubis and the inner border of the anterior superior iliac spine; at this point the nerve passes below Poupart's ligament, and to reach it the needle should be inserted vertically not more than 1 cm. below the ligament since the nerve divides at about that level. The nerve usually lies at a depth of 0·5 to 1 cm. below the fascia. When the needle reaches the nerve pain is experienced by the patient, shooting down to the knee, and the quadriceps will sometimes (but not invariably) twitch. Five cubic centimetres of the novocain solution should be injected around the nerve, and, if possible, partly into the sheath.

The authors' experience of this method of inducing anæsthesia is limited to between 20 and 30 skin-grafting operations, and in only one of these—a very nervous individual—was the degree of anæsthesia so light and its duration so short as to be unsatisfactory. As a rule, perfect anæsthesia lasted for three-quarters of an hour and often longer, the patients being quite undisturbed by the removal of the grafts and the sewing up of the little wounds.

When, instead of Steele's grafts, a strip of skin is removed as described below to provide "section" grafts, it has been found more convenient to employ infiltration anæsthesia than nerve blocking.

For this purpose a 0·5 per cent. novocain solution, to which 1 in 50,000 adrenalin has been added, is injected into the subcutaneous tissue along two parallel lines of the desired length, about 1·5 cm. apart. An oblong anæsthetic area about 3 cm. wide is thus obtained.

The viability of the grafts taken from such an infiltrated area is not in any way impaired.

*The Grafting Operation.*

The cutting of the grafts is carried out as follows:—

By taking a superficial but firm hold of the surface with towel-holding forceps* a small cone of skin is raised; it is then extremely easy, by cutting horizontally through the base of the cone with a scalpel, to remove roughly circular grafts of 6 to 12 mm. in diameter, whose cut surface includes, from edge to centre, the epidermis and most of

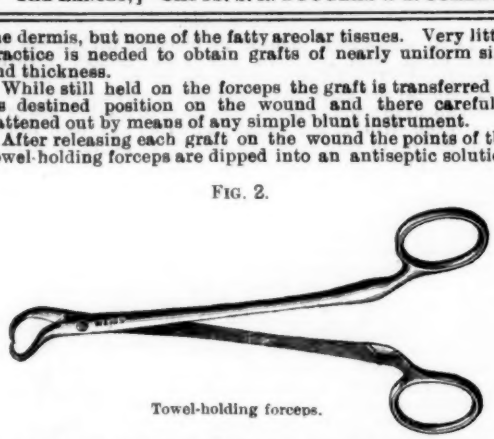
* As a matter of fact the instrument used, although similar to towel-holding forceps in design and often used as such, is listed in Weiss's catalogue as Backhaus's basting forceps (Fig. 2). The points should be sharp and should meet accurately where they slightly overlap. If this is attended to and the joint kept tight there will be no need to take a deep bite into the skin when lifting it. (The points should be more strictly parallel than is shown in the figure.)

the dermis, but none of the fatty areolar tissues. Very little practice is needed to obtain grafts of nearly uniform size and thickness.

While still held on the forceps the graft is transferred to its destined position on the wound and there carefully flattened out by means of any simple blunt instrument.

After releasing each graft on the wound the points of the towel-holding forceps are dipped into an antiseptic solution

FIG. 2.



Towel-holding forceps.

in order to avoid the possibility of carrying organisms into the small aseptic wounds from which the grafts were taken. These little wounds in turn are each closed with a single, shallow stitch and the whole area covered with gauze and collodion. It is advisable to leave the stitches in place for from 10 to 12 days.

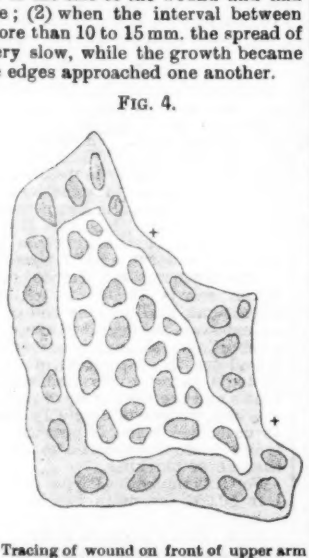
The disposal of the grafts on the wound is a matter of considerable importance. Reverdin's observation that epithelium spreads much more quickly either between the edge of the wound and a graft, or between two grafts when the interval is not more than 8 mm., than around isolated grafts is constantly being confirmed.

This fact was also strikingly demonstrated by the experimental work of Carrel, who showed that (1) the rate of epithelial growth over an aseptic or almost aseptic surface was inversely proportional to the size of the wound and had no connexion with its age; (2) when the interval between the epithelial edges was more than 10 to 15 mm. the spread of the epithelial edge was very slow, while the growth became quicker and quicker as the edges approached one another.

FIG. 3.

Outline of a wound on the front of the thigh (T. S.) to show disposition of Steele's grafts taken from the other thigh. Every graft "took" perfectly and the surface was entirely covered with epithelium on the fourteenth day after grafting. (From a tracing on thin sheet celluloid.)

FIG. 4.



Tracing of wound on front of upper arm (J. R. H.) to illustrate grafting in two stages. The shaded border shows the new epithelium formed within 12 days about the grafts transplanted at the first operation. Two, out of 22, failed to "take" on that occasion—hence the narrower border at the points marked +. On the twelfth day after the first operation 21 more grafts were transplanted, as shown, on the unhealed centre of the wound; every graft "took" perfectly, with the result that the wound was entirely covered with epithelium on the twenty-second day after the first operation.

These tracings, as well as Fig. 5, are reproduced at half scale.

This and other considerations have led the authors to formulate the following rules:—

I. Whenever possible the grafts should be arranged over the whole surface of the wound as near together as is shown in Fig. 3 or even somewhat closer.

II. If the wound is so large that too many grafts would be required to cover it at a single operation one or two rows should be first placed round the edge, and about 12 days later, when these are well incorporated into the growing edge, the remaining surface should be grafted. Fig. 4 illustrates a case treated in this way.

Another method, to which the term "section grafting" has been applied, deserves to be further tried for the grafting of large wounds, and may here be described. Its particular merits are that it is very economical of skin and leaves no raw area to heal.

An elliptical strip of skin from 5 to 10 cm. long and about 1 cm. wide is dissected off an area of the thigh or arm anæsthetised by infiltration with novocain solution. In doing this care should be taken to avoid including the subcutaneous fat, and any of this found adherent to the strip after its removal should be carefully pared away. The strip is now divided with scissors into thin vertical sections, which are placed in warm Locke's solution and then transferred to the wound, being disposed on it, as suggested above in the case of the round grafts. Fig. 5 shows the appearance and arrangement of such grafts on a wound. The wound from which the skin was taken is in due course closed with sutures.

FIG. 5.

Tracing of wound of back of thigh (C. C.) to illustrate the use of "section grafts." This method was used in this case because some 35 Steele's grafts had previously been taken from the patient's other thigh under local anæsthesia, so that there was not a very large area of skin to draw upon. The 63 sections were obtained by cutting up a strip of skin 9 cm. long by 1·5 cm. wide, taken under local anæsthesia. It will be noticed that the grafts next the edge are placed "lengthwise on."

It will be evident that, if this method of grafting proves generally successful, as the authors' cases suggest that it well may, by a refinement of the technique of cutting up the strip of skin, such as a method of embedding without impairing the viability of the tissues, a very small piece of skin could be made to furnish grafts sufficient to cover a very large granulating surface. It is probable, however, that the scars resulting from such thin grafts would, like those resulting from Thiersch's grafts, prove unduly susceptible to slight injuries and trophic ulceration.

In one case a small piece of skin was frozen and cut with a microtome into thick sections, which were then placed on the granulating surface. The result, however, was most unsatisfactory, none of the grafts becoming adherent.

*After Treatment.*

Grafts newly placed on a wound are exposed to two chief dangers: (1) that of mechanical disturbance before they have become firmly adherent; (2) that of accumulation of pus, which, by the liberation of tryptic ferments, leads to the digestion and disintegration of the epithelial tissues.

Various devices have been employed to protect the grafts from the first of these dangers—e.g., by strips of rubber, of diachylon or zinc plaster, by sheets of oiled silk, or wire filigree, and latterly, with more success, by wool and canvas fabrics coated with some non-absorbent substance such as wax or rubber; from time to time also it has been recommended to use no dressing at all in contact with the grafts.

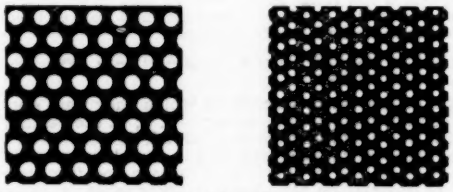
Whichever of these methods has been adopted the wounds have almost invariably been left undisturbed for several days on the ground that any change of dressing would be perilous to the immobility of the grafts. It is this practice which, in the authors' opinion, has contributed more than any other factor to the failure of skin-grafting operations, for it has only averted the one danger—movement of the grafts—at the cost of greatly increasing the other—the tryptic action of the pus.

In attempting to develop a plan of after-treatment which should protect the grafts from both these dangers search had first to be made for a material which would accurately fit

the irregularities of the wound, hold the grafts securely in position, and at the same time allow of the perfectly free escape of any discharge.

The thin celluloid previously introduced by one of the authors (S. R. D.) was first tried, but was found to be suitable only when the grafted surface was perfectly flat. Various oiled silks and similar fabrics perforated by hand were tried and proved much more suitable; finally, Messrs. Maw, Son and Sons, learning what was required, produced the excellent material depicted in Fig. 6 under the name of

FIG. 6.




"Perforated Parex Protective" (Maw, Son, and Sons, Limited). Size of perforations as shown. (1) will be found most suitable for covering Steele's grafts; (2) for covering "section grafts."

"Perforated Parex Protective." This is simply an oiled fabric suitably perforated; it is strong, durable, and can be boiled; it is sufficiently supple to follow the irregularities of the wound, adheres lightly to the surrounding normal skin, but hardly at all to the granulations or the grafts. Contact with strong alkaline or carbolic acid solutions spoil it.†

When a layer of this material is placed between the grafted surface and the outer dressings it has proved perfectly feasible and safe to change the latter every day following the operation provided these dressings have kept moist. Except in the case of the few wounds which have practically no discharge such a daily change of dressing is not only advisable but indispensable for successful grafting.

Locke's solution,‡ as representing most nearly the blood fluids, is used for cleansing the wound both at the time of operation and also at the daily dressings. Ringer's solution might prove equally suitable, and, failing it, normal salt solution should be used.

*Detailed Description of the Routine Dressings.*

When the grafts are all in position on the wound the surface is moistened with a fine spray of Locke's solution. The Parex protective is now applied, and should be cut large enough to cover a fairly wide border of healthy skin around the wound, to which it is securely fixed with adhesive plaster. In the case of wounds of the limbs, especially those on dependent surfaces, one or more strands of thread tied round the limb over the protective will help to maintain it in more perfect apposition to the grafted surface.

For the outer dressing a roller of butter muslin—not more than double-fold in thickness—is soaked in hot Locke's solution and applied wringing wet by unrolling it to and fro over the wound so as to cover the surface with many thicknesses, which are finally fixed in place by carrying the roller firmly round the limb and securing it with a safety-pin. Over this an amply large sheet of good quality oiled paper is placed; in the case of a limb it should be large enough to wrap right round and overlap by a wide margin. Usually no wool is applied outside this, but it is important that the outer bandage should be firm enough to bind the oiled paper closely to the skin, for in this way evaporation is prevented and the butter muslin retains its moisture for at least 24 hours.

Whenever, as in the case of wounds of the trunk, it is difficult to maintain the oiled paper in such perfect apposition to the skin as to prevent evaporation, it will be found advisable to insert a Carrel's tube, through which a small quantity of Locke's solution is injected at suitable intervals. The type of Carrel's tube used for this purpose consists of a rather fine rubber tube which is coiled amongst the folds of the butter muslin, one end being brought out through the oiled paper and bandage, the other being closed with a ligature and the sides perforated for some 25 cm. with small holes. Through the open end lying outside the bandages the Locke's solution is injected with a syringe.

† This material has also largely supplanted the use of the thin perforated celluloid in the dressing of other types of wounds for the purpose of preventing the sticking of the dressings to such painful surfaces as those occurring after circular amputations, &c. The thicker sheets of celluloid still furnish the best material for the support of limbs in connexion with skeleton splints.

‡ Locke's solution contains, in a litre of distilled water, sodium bicarbonate 0·15 gm., calcium chloride 0·24 gm., potassium chloride 0·42 gm., glucose 1·0 gm., sodium chloride 9·2 gm.

Finally, a simple splint is applied if this will assist in keeping the part at rest or prevent the dressings being disturbed by pressure on the bed or by movements of the patient.

At each daily dressing for a week following the operation the oiled paper is removed, the butter muslin well soaked with Locke's solution by means of a spray, and then removed layer by layer (not turned back *en masse*), the protective being carefully held down by forceps if there is the slightest tendency for its separating from the grafted surface; this, however, is unlikely to occur if the dressings have been kept moist.

The wound may be now thoroughly washed with a fine spray owing to the abundant perforations of the protective, without any risk of disturbing the grafts. Butter muslin soaked in warm Locke's solution is then reapplied as before.

The use of the spray for this purpose, and also in dressing many other wounds, has, in the authors' hands, proved so efficient, as well as economical, as to justify a short note.

The type of spray used is shown in Fig. 7. It is of very simple construction throughout, having one ball valve, which gives no trouble unless allowed to rust, and one of thin leather, which is very easily replaced. On account of this leather washer the spray should not be boiled, but may be readily sterilised by immersion in, and filling with, 5 per cent. carbolic acid solution.

FIG. 7.

A bottle of each lotion in common use may conveniently be fitted with a separate spray and carried from case to case, there being no necessity for resterilisation of the instrument if ordinary precautions are taken to prevent fouling it. The spray delivered by this simple apparatus will be found to cleanse the large wounds at present so common more quickly and effectively, and at the same time with much less discomfort to the patient than the time-honoured, but often very inefficient, glass syringe.

After about a week the protective is removed to determine the exact condition of the grafts, but it is advisable to continue its use for a further period of two or three days in order to save the young epithelium from any possible injury through direct contact with the outer dressings. At this stage, or even some days earlier, Locke's solution has in some cases been replaced by a 0·1 per cent. solution of brilliant green in distilled water, on the ground that this latter solution is said to favour the growth of epithelium, and certainly assists in keeping a granulating surface bacteriologically clean.

While this paper was being written the authors' attention was directed to a letter in THE LANCET of June 3rd, 1916, by Hagmann, a surgeon of Moscow, describing the after-treatment he adopts. This includes, although Hagmann does not emphasise the importance of it, a daily wet dressing, normal salt solution being the fluid used. His grafts were kept in place by a larged-meshed canvas, such as is used for wool work, coated with paraffin wax. With this method of after-treatment, which closely resembles that worked out independently by the present authors, Hagmann states that he has grafted more than 20 wounds without losing a single graft.

*Results Obtained.*

With regard to the methods described above in detail, it will be asked: (1) In what circumstances, and how often, have the grafts been found to "take"? (2) What has been their subsequent history and what is the character of the resulting scars?

The cases grafted during the period covered by this investigation were drawn from a series of 63 severely wounded men under treatment in the Medical Research Committee's wards of the Inoculation Department at St. Mary's Hospital. With such a small number to choose from, it will be seen that no selection of especially suitable wounds could be made—as a matter of fact, several of the wounds were distinctly unfavourable.

Following the nomenclature employed by certain American authors, the term "autodermic grafts" is used to signify grafts taken from the individual to whom they are applied, while "isodermic grafts" is used when the grafts are taken from another individual or an amputated limb, &c.

The total number of transplantation operations was 33. Of these, in 29 the grafts employed were of Steele's type, 22 being autodermic and 7 isodermic. In the remaining 4 operations section grafts (autodermic) were used. It was usually easy to determine the exact number of grafts which became adherent, so that the success or failure of the operations—in that respect, at any rate—may be expressed in a roughly quantitative manner.

*Autodermic Steele's grafts.*—The results obtained with this type were as follows: Of the grafts employed—

80 to 100 per cent. became adherent in 12 out of the 22 cases.
40 „ 80 „ „ „ 7 „ 22 „
5 „ 15 „ „ „ 2 „ 22 „
In the remaining case the result was a complete failure.

These results, although satisfactory, do not really represent the standard of success which could be attained if the cases were selected; some of the cases having been grafted simply to ascertain the limits of the operation, while in others the operation was carried out before the full technique had been developed.

The progress of the grafted wounds and of the grafts themselves has usually been uneventful.

Cases have differed in the rapidity with which the epithelium has spread between the grafts, but once formed it has rarely broken down. The rapidity of sound healing and the strength of the scar seem to be directly proportional to the proximity of the grafts to each other.

In one case only have autodermic grafts been observed to shrink and disappear after they had become securely adherent.

This occurred in a large wound of the buttock which was discharging more freely than any of the other wounds grafted; moreover, the grafts in this case had been disposed indiscriminately over the wound, the authors at that time not having recognised the importance of placing the grafts near the growing edge and in proximity to one another. Of the 50 grafts applied in this case only 23 became adherent, and of these latter but 6 or 7, being those more favourably placed, ultimately survived.

For several months, and probably much longer, the grafts remain clearly visible, standing out from the surrounding scar as opaque areas of normal skin. Although the authors' experience has not been sufficient, nor the period of observation long enough to permit of a well-founded judgment, first impressions are very favourable to the scars resulting from Steele's grafts.

It has occasionally been noticed that in certain grafted wounds, just as in the case of ungrafted wounds, the marginal epithelium previously formed has shown a tendency to break down, but this ulcerative process has not extended to the grafts nor to the epithelium formed around them, which appears to be, for some unexplained reason, more resistant. This confirms the similar observations published by Reverdin.

As to the later stages, it has already been stated that the grafts appear but little changed at the end of six months, and from the literature this seems to be also true of much longer periods. Each of these areas having the appearance of normal skin undoubtedly constitutes, as claimed by Steele, a strong point in the scar, having much more elasticity and also affording a thicker protective covering of compact tissues than is present in naturally formed scars. Moreover, the scars resulting from Steele's grafts have seemed less adherent to the deeper structures.

*Isodermic Steele's grafts.*—Grafts taken from amputated legs furnished the material for seven transplantation operations, the average number of grafts employed being about 83.

Four limbs were used, all of which had been amputated for injuries received several days or weeks before, and although each presented one or more suppurating wounds there was also an area of approximately healthy skin from which it was judged legitimate to take the grafts. Cultures were made from the cut surface of the grafts taken from each limb and proved sterile. This was of particular interest in the case of one limb which for two months had been the seat of very extensive septic infection, leading to constant fouling of the healthy skin with pus.

It will be agreed that grafts from such a source were not very promising material; they were transplanted in these cases rather with a view to ascertaining the limits of their usefulness than in the expectation of success. The following procedure was adopted for taking them.

Having been kept in a moist cloth until required, the limb was suspended with the severed end downwards; it was then thoroughly washed with soap and an antiseptic solution, the cut surface was roughly sewn up in order to make the skin taut and so facilitate the cutting of grafts in the manner described above under the heading of "The Grafting Operation."

As to the length of time which it is permissible to keep the limb before use, it can only be said here that some 200 successful grafts were taken on one occasion 16 hours after the amputation, the limb having been kept meanwhile at room temperature (in May).§ In five of the remaining six cases the grafts were removed within six hours of amputation and applied at once to the wound—in the sixth case they were also taken within six hours, but kept in Locke's solution at about + 6° C. until the following day when they were successfully grafted upon an amputation stump.

It appears to be quite unnecessary to transfer the grafts directly from the limb to the wound, and is certainly far more convenient to cut them elsewhere and convey them to the bedside in warm Locke's solution.

The results obtained with these grafts have been, on the whole, surprisingly good.

On six of the seven wounds to which they were applied 80 per cent. or more of the grafts "took"; in the remaining case, that of a very unsatisfactory wound, the result was very poor, only three or four grafts gaining a hold temporarily.

The cases grafted in this way have been too few and the period of observation too short to show what is the subsequent history of these grafts; up to the present, however, they have given the impression of being somewhat less satisfactory than autodermic grafts. As compared with the latter the epithelial attachment of the isodermic grafts to the granulations has seemed looser, a certain number of them coming away after having been adherent for a week or so, and others standing off the surface at first, with the appearance rather of ragged pieces of false membrane than of healthy grafts; moreover, the spread of epithelium around the isodermic grafts has often been slower than usual, although ultimately they have become consolidated so as to form a firm scar.

With these qualifications it may certainly be said that the use of isodermic grafts in some circumstances is well worth while—e.g., in the case of wounds so large that sufficient autodermic grafts cannot possibly be obtained.

One of the seven cases treated was of such a kind—a burn of the third degree, extending from the iliac crest to a short distance above the ankle and involving more than three-quarters of the circumference of the thigh and leg. Although healing is still far from complete, very large parts of this surface have been covered by two applications of isodermic grafts to the number of about 400 and numerous small centres of growth have also been established.

The results obtained in this case alone prompt the suggestion that the opportunity afforded by an amputation should never be lost when there are large wounds to heal. Whenever possible a Wassermann test of the patient whose limb is to give the grafts should be performed.

*Section grafts.*—These have been tried in four cases only, the skin being always taken from the patient. A short description of each case is here given.

No. 1. A large wound on the front of the thigh, part of which was grafted with "section" grafts, the remainder with Steele's grafts. The result was that practically all the grafts "took," and the whole wound was soon completely healed.

No. 2. A small granulating surface on an amputation stump; the wound had been previously grafted round the edge with Steele's grafts. Again the result was almost perfect, as about 90 per cent. of the grafts "took," and the whole surface was healed in a few days.

No. 3. A large wound over the popliteal space and a small one over the great trochanter. The patient at the time of the operation had fever and his general condition was not at all good. Two sinuses at the upper end of the grafted wound were discharging pus, and although this was not allowed to come into contact with the grafts the suppuration may have exercised an indirect effect upon the result.

None of the "sections" in this case became adherent, but after 10 to 14 days many delicate points of epithelial growth were noticed on the area where the grafts had been placed, and these quickly spread, causing the wound to heal more rapidly than it would otherwise have done.

The failure of these grafts to become adherent may well have been due to the fact that the limb was not slung after the operation, for, the wound being on the back of the thigh, the dressings must inevitably have rubbed upon the bed and the grafts been more or less disturbed.

No. 4. A wound over the popliteal space, the extent of which is shown in Fig. 5. The wound surface in this case has never been entirely satisfactory, although at the time of grafting it had improved to some extent; one point which was always very noticeable was its extreme sensitiveness, a condition so foreign to the healthy granulating wound as to suggest some slight nerve injury. Three or four days after the grafting there was an increase in the amount of the discharge.

The result of the grafting in this case was again unsatisfactory, as all the grafts were digested by the tryptic action of the pus, but not before about 40 per cent. of them had established small delicate flakes of epithelium, a few of which persisted and afterwards spread, leading to some diminution in the size of the wound.

These cases, although few in number, indicate that this method of grafting is worthy of an extended trial, for the

§ More recently a number of grafts have been successfully transplanted from a limb 26 hours after its amputation.

result in two out of the four cases was quite perfect, and in the other two, although the grafts themselves did not "take," so many islands of epithelium were left on the surface as to considerably hasten the healing of the wound; similar islands of epithelium have also sometimes appeared where Steele's grafts have been applied and failed to adhere.

*Remarks on the Conditions of the Wounds which Favour or, as the case may be, are Opposed to Successful Grafting.*

There is at present no definite criterion by which a wound surface may be judged as favourable for the operation of grafting.

The authors have supplemented naked-eye observation by film preparations of the discharge. If the bacteria are few in number and chiefly intracellular this is held to confirm the opinion that the wound is suitable for grafting. In a series of cases cultures as well as films were made just before the operation in order to determine whether any particular types of bacteria were specially inimical to the grafts. Staphylococci, diphtheroid bacilli, and *B. pyocyaneus* were the types most commonly present, and although these observations did not show it conclusively, the impression was gained that *B. pyocyaneus* tended to be more harmful than any of the other micro-organisms found.

As regards naked-eye appearances, the most favourable type of wound to graft is one which, on the removal of the dressing, shows a perfectly clean, flat surface covered with small bright-red granulations, quite painless on being touched, and having at the periphery an actively growing epithelial edge; the amount of pus discharged from this type of wound is usually very small.

A less perfect type of wound for grafting, and, unfortunately, a more common one, is that on which the granulations are coarser, paler in colour, less firm, tending to be œdematous and to bleed on the slightest touch; from such wounds the discharge is invariably more abundant.

Frequently this latter type of wound can be brought nearer to the first-mentioned type by the application, for a day or two, of pressure combined with a nitrate of silver, zinc sulphate, or brilliant green lotion.

A wet dressing of 0·1 per cent. brilliant green, enclosed in oiled paper and firmly bandaged, has proved perhaps more valuable than any other in preparing surfaces for grafting, and since, as has been mentioned above, it stimulates the growth of epithelium as well as keeping down the bacterial flora, it has also been used with success in place of Locke's solution a few days *after* the grafting operation.

It may here be mentioned that in a single case a 1 in 2000 solution of flavine was employed on a somewhat unsatisfactory wound surface which it was desired to graft for the second time. Whether due to the flavine or some other cause the result was disastrous, for within three days of its application all the grafts previously transplanted round the edges and the new epithelial border which had formed about them had disappeared. During the same time the bacterial flora changed from a very few *B. pyocyaneus* to many streptococci.

It will be found that by using some such method of preparation of the wound, together with the grafting operation and after-treatment described above, the number of wounds which may be grafted with success is greatly increased, since a moderate amount of discharge, containing but few microbes, will not suffice to digest the grafts when it is daily removed by dressing the wound. Moreover, it has proved perfectly feasible, by division of the dressings, to graft one part of a large wound where the surface is favourable, while in the other part, owing to the persistence of a sinus, too much pus is present. This was done on two occasions with complete success for a large wound on the outer side of the elbow complicated with a compound fracture of the ulna, and healing was thereby hastened by several weeks.

Apart from actually "septic" surfaces, perhaps the most unfavourable surface to graft is that resulting from a large wound complicated with the loss of much tissue. After many weeks of filling up and contracting such a wound shows a surface covered with pale granulations which rest on a dense mass of scar tissue. The worst results of the authors' series occurred with wounds of this type, on one occasion only one graft holding, on the other none.

The last point to be considered is, At what time should the grafting operation be carried out?

From clinical observation it is well known that large granulating wounds rapidly contract in size during the early period of the healing process, and although this contraction may at times be advantageous, at other times it causes any but desirable results, this being especially the case when the wound is in the neighbourhood of a joint or in the region of the face. Further, from similar observations it appears probable that once a wound is covered with epithelium the formation and contraction of scar tissue ceases.

These clinical observations have been strikingly confirmed by the experimental work of Carrel, by which he has demonstrated that (1) the amount and rapidity of the contraction in a wound depends on its size, the larger the wound the greater and more rapid the contraction; (2) the contraction is much more rapid in the early stages of the healing process and in the later stages it tends more and more to become stationary; (3) the contraction entirely ceases as soon as the surface is covered with epithelium; (4) after the healing is complete the cicatrix tends to enlarge.

From these results it will be seen that the correct time for grafting a wound will depend largely upon its situation. Thus if the wound is so situated that any contraction of the scar would tend to limit the movements of a joint, or by pulling on the surrounding soft parts cause some deformity, as in the facial region, it is obviously of paramount importance to obtain an epithelial covering as early as possible; if, on the other hand, the contraction of the granulation tissue tends only to lessen the size of the raw surface without causing any deformity or other disadvantage the grafting operation should be delayed until this process slows down, but the delay should not be prolonged to that stage when, from the contraction of the deep scar tissue, the wound surface becomes unfavourable for the reception of the grafts.

*Summary and Conclusions.*

In 1869 Reverdin introduced the method of implanting tiny portions of skin upon granulating surfaces to serve as centres of growth.

Steele in 1870 improved upon this by cutting the grafts rather larger and thicker in order to obtain stronger and more elastic scars. His grafts varied in size from the diameter of a pea to that of a threepenny-piece or even larger.

Both of these methods appear to have been widely practised and with considerable success. They were given up, however, in course of time because of the more rapid and striking results sometimes achieved with the method introduced later by Thiersch, which aimed at covering the entire wound surface with grafts at a single operation.

The Thiersch method, in turn, was found to have serious disadvantages; in particular, the adhering of the grafts was uncertain, and the scars resulting from it were often unsatisfactory. Recognition of these drawbacks and forgetfulness of the older methods has resulted in the operation of skin-grafting being now seldom practised, in spite of the great opportunity at present afforded to make use of it.

The authors have revived the use of Steele's grafts and introduced certain new features into both the grafting operation and the after-treatment, which aim at making the transplantation of skin a simple, reliable procedure.

With respect to the grafting operation the chief new, or at least unusual, features are: (1) the use of local anæsthesia induced by nerve blocking; (2) the suture of each of the raw surfaces left after removal of the grafts.

With regard to after-treatment the authors have been influenced by the recognition of the important part played by the tryptic action of pus, which recent work has explained and emphasised. There is little doubt that neglect of this factor has been one of the commonest causes of failure of skin-grafting operations; in consequence the after-treatment advocated has aimed especially at preventing the accumulation of pus while avoiding at the same time any movement of the grafts. The means employed to achieve this were:—

(i.) The employment of a new and suitable material to hold the grafts in position and allow the escape of any discharge from the wound; at the same time it permits the surface to be efficiently cleansed at frequent intervals.

(ii.) The daily change of the outer dressings, which are kept constantly moist with some bland fluid.

The advantages claimed for the methods advocated are that—

1. Successful results can be obtained much more constantly.

2. The use of a general anæsthetic is dispensed with.

3. The raw surfaces left after the removal of the grafts, being closed with sutures, heal rapidly and certainly.

4. The resulting scars are stronger, more elastic, and less prone to ulceration than those resulting either from Thiersch's grafts or from the natural healing of wounds.

In addition, it is probable that by early grafting it will be possible to prevent many of the deformities due to the contraction of scar tissue

The results obtained in 29 transplantations of Steele's grafts are given, 22 of which were autodermic and 7 isodermic. These may be summarised as follows:—

80 to 100 per cent. of the grafts adhered in 18 out of these 29 cases.
48 „ 80 „ „ „ 7 „ 29 „
5 „ 15 „ „ „ 3 „ 29 „
In the remaining case the result was a complete failure.

Under the name of "section grafting" an alternative method of obtaining grafts is described which has the merit of being very economical of the skin taken for the grafts, and leaves a simple sutured wound at the site from which the skin was taken. This type of graft was employed in four cases, two of which were perfect successes and the remaining two partial successes.

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# THE TREATMENT OF WOUNDS OF THE KNEE-JOINT.

BY T. S. NOVIS, F.R.C.S. ENG.,
MAJOR, I.M.S.

INJURIES of the knee-joint met with in military surgery are usually produced by rifle bullets, shrapnel, or pieces of high-explosive shell. Bayonet or sabre wounds are rare. There may or may not be injury to one or more of the bones which enter into the articulation. In some cases injury is so severe as to necessitate immediate amputation, but in the majority of cases an attempt should be made to save the limb.

These injuries may be divided into four classes.

*Classes I. to III.*

*Class I.*—Contusions of the joint, caused usually by spent bullets which, though they often lodge in the tissues, do not penetrate the synovial membrane, but give rise to hæmorrhagic effusion into the joint cavity. Thorough cleansing of the wound and removal of the bullet, together with any foreign matter which may have been carried into the tissues, followed by complete rest in a Thomas's knee- or a back-splint with a foot-piece, is usually all that is necessary, though aspiration will in some cases expedite recovery.

*Class II.*—Wounds of the joint usually produced by rifle bullets fired at a moderate range, which traverse the joint without doing severe injury to any of the bones and in which infective material does not appear to have been carried into the synovial cavity. These cases are suitable for excision of the wound and suture of the synovial membrane, though many cases recover without surgical interference provided the joint is kept at rest, as shown by two cases which have come under my observation:—

One was suffering from arteriovenous aneurysm of the popliteal vessels produced by a rifle bullet which had perforated the patella and passed through the knee-joint, injuring the vessels in its course. No operative treatment had been performed, but three months after the injury all effusion had been absorbed and movements were perfect in every respect.

The other was a case shown to me by Major Fayrer, I.M.S., in No. 5 Indian General Hospital, in which the bullet had penetrated the joint anteriorly, leaving a small wound with dirty-grey edges, from which synovial fluid was freely escaping. The bullet was shown by X rays to be lying between the condyles of the femur at the back of the joint. Fluid drawn from the joint was sterile and the wound healed under antiseptic dressings. The bullet was subsequently removed by operation.

*Class III.*—Wounds of the joint with gross injury to one or more of the bones which enter into its formation, but in which there is no apparent infection of the synovial cavity. The treatment in these cases should follow the same lines as in Class II., but in addition the fragments of the fractured bone or bones should be placed and maintained in good position, complete rest secured, and the introduction of wire or screws should, as far as possible, be avoided until there are good reasons for believing the danger of suppuration in the joint has passed.

*Class IV.: Infected Cases.*

*Class IV.*—Wounds of the joint with or without gross injury to the bones, complicated by the presence of infective material in the synovial cavity. I have placed these cases in one group; but bone injury introduces additional difficulties in treatment, and gravely influences the prognosis.

If the case is seen early, complete excision of the wound, removal of all foreign material, and suture of the synovial membrane after carefully washing out the joint cavity with ether may prove efficacious in mild infections. The treatment should be followed, when necessary, by aspiration and injection of ether, saline solution (1–5 per cent.), glycerine, iodoform-ether, or formalin 2 per cent. in glycerine every day or two until the aspirated fluid is found to be sterile (Dakin's fluid, chloramide, a powerful and comparatively non-irritating antiseptic, might prove a successful substitute for ether). Should the patient get progressively worse or show no improvement after aspiration and injection have been given a few days' trial, more radical methods should be adopted before the knee-joint becomes disorganised.

Unfortunately, no case has come under my care sufficiently early to justify the employment of this method of treatment, but I have tried hypertonic saline irrigation with disappointing results, the patients gradually getting worse until thorough drainage of the posterior pouches had been established. My experience is very limited, but to me it seems possible that the action of hypertonic salt solution in drawing out antibodies is not so potent in the case of the knee-joint as in other regions of the body which appear to have greater resistance to the growth and spread of pyogenic organisms. The anatomical formation of the knee-joint is also such as to render satisfactory lavage through anterior incisions only extremely difficult, if not impossible.

The synovial membrane extends upward under the quadriceps as the subcrureus bursa and forms lateral pouch on either side of the patella, then extends backwards under the lateral ligaments to form the posterior pouches at the back of the condyles of the femur, lining the posterior ligament of Winslow to near the middle line, when it is reflected forward on either side of the crucial ligaments to become continuous in front of these structures. The condyles of the femur fit so accurately into the cups on the head of the tibia and are held in such close apposition by ligaments that it is impossible to pass a sheet of note-paper between the cartilage-covered surfaces; moreover, when the posterior pouches have been freely opened and the front of the joint is being irrigated little or no fluid will drain through these incisions, showing that the knee consists of three almost watertight compartments.

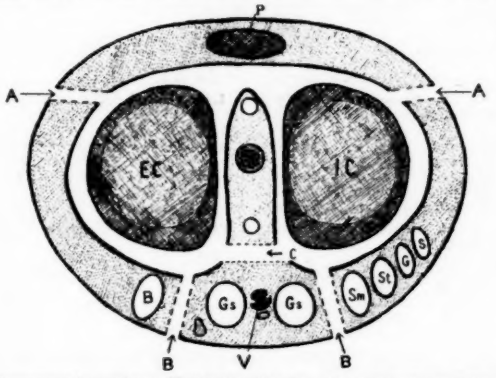
Infection, however, spreads backwards sooner or later, and no amount of vigorous treatment of the anterior cavity will affect suppuration in the posterior pouches. In my opinion the anatomical construction of the joint alone will explain the frequent failure of irrigation when efficient posterior drainage is not provided, and the frequency with which pus finds its way through the back of the joint and burrows amongst the muscles of the thigh and calf, rendering treatment difficult and prognosis bad.

The method of drainage I have employed for the last 12 years in severe traumatic infections of this joint is illustrated in the accompanying diagrammatic section. The method appears to be equally satisfactory in septic gunshot wounds, and was suggested to me by the late Mr. Harold Barnard, though I am not sure the incisions are identical with those described by him.

A free incision is made into the subcrureus bursa and into the lateral pouch (A) on either side of the patella and drainage-tubes of moderate size inserted into the joint. The patient is then turned on his face, an incision made on either side (B) between the hamstring and the gastrocnemius,

and the ligament of Winslow freely incised longitudinally over either condyle of the femur.

In making the external incision care must be taken to avoid the external popliteal nerve which should be drawn inwards with the gastrocnemius. In cases where suppuration is prolonged difficulty may be experienced in keeping open the posterior incisions, but in these cases good drainage can be obtained by making a communication (C) between the posterior pouches in front of the ligament of Winslow and behind the crucial ligament and passing a small tube through from one posterior incision to the other.




Diagrammatic section to illustrate author's method of drainage of knee-joint. A, incisions into lateral pouches; B, incisions into posterior pouches; C, incision to establish free communication between posterior pouches. Bones: P, patella; EC, IC, condyles of femur. Muscles; B, biceps; GS, gastrocnemius; SM, semi-membranous; ST, semi-tendinosus; G, gracilis; S, sartorius; V, popliteal vessels. The nerves are shown but not lettered.

The limb should be fixed on a splint in a slightly flexed position. Mr. Hey Groves's femur splint or the Balkan splint is the most satisfactory, as they allow slight extension to be applied, which adds to the comfort of the patient and delays erosion of cartilage. Moreover, the wound can be dressed without disturbing the limb.

Irrigation with salt solution, weak iodine, or other mild antiseptic should be carried out in the early stages, and if there is much inflammation hot fomentations are beneficial. I usually employ lint soaked in liq. sodæ chlorinatæ (1 in 40). The drainage-tubes should be removed as early as possible, and gentle passive movements commenced as soon as active mischief has ceased. Great care must be taken to prevent the tibia falling back on the femur while the wounds are healing and the ligaments still soft.

*Results.*

In all five cases of infection of the knee-joint due to the gunshot or shell wounds which have come under my care the time for practising excision of the tissues surrounding the wound and suture of the synovial membrane had passed.

One case had been suffering from suppuration in the joint for four or five weeks, accompanied by severe constitutional symptoms. I drained the joint by the method described above, but as no improvement resulted in general condition, the leg was amputated a few days later. The cartilage was found eroded in places, but there was no collection of pus in any part of the joint. I regret he died from pyæmia, but had his knee been freely drained at an early date, it is my belief that both limb and life would have been saved.

A young Australian, from the lower end of whose femur a shrapnel bullet had been removed and the synovial membrane sutured after excision of the infected tissues, arrived from the Peninsula at the Bombay Presidency Hospital with severe constitutional symptoms and his knee-joint inflamed and distended with pus. The knee was drained through anterior and posterior incisions, and though he went through a mild attack of tetanus, which delayed progress, he recovered with a joint possessed of fair and an increasing amount of movement.

Two other cases from the Peninsula were treated by continuous hypertonic saline irrigation, but as they both appeared to be losing ground I established free drainage five or six days later with satisfactory results.

Another case was under the care of one of my colleagues who, after removing all foreign material and grossly infected tissue, tried continuous irrigation with hypertonic, followed by normal saline solution. The local condition gradually got worse, and after three weeks suppuration appeared in the tissues at the back of the thigh necessitating an incision. A week later I was asked to operate, and found that one of the posterior pouches had ruptured, causing suppuration amongst the muscles, and the other, when incised, discharged about a drachm of pus. His condition steadily improved, until he was transferred on the departure of the Bombay Presidency Hospital.

In conclusion, I wish to emphasise the necessity for free drainage of the posterior pouches. If this is done at a reasonably early stage the large majority of cases will recover with a useful limb and many with a fair range of movement. Complete ankylosis will by no means necessarily follow. I am convinced that too extended a trial of milder methods of treatment has led to the loss of many limbs and lives which might have been saved had free drainage been established earlier. Moreover, free incisions into the posterior pouches will do all that can be hoped for from freely opening up the joint by cutting through the ligamentum patellæ and other ligaments and will leave an infinitely more useful limb.

## A NEW PHYSICAL SIGN IN PNEUMOTHORAX AND IN PLEURAL EFFUSION.

BY OLIVER K. WILLIAMSON, M.A., M.D. CANTAB., F.R.C.P. LOND.,

ASSISTANT PHYSICIAN TO THE WESTMINSTER HOSPITAL AND TO THE EAST LONDON HOSPITAL FOR CHILDREN; PHYSICIAN TO THE CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST, VICTORIA PARK.

THE sign dealt with in this paper and which, so far as I am aware, has not been previously described, I have found to be present, as far as appears from the number of cases examined, in the great majority of instances of pleural effusion, and it seems to occur in an even greater proportion of patients afflicted with pneumothorax. In fact so frequently have I observed the phenomenon that I consider that it may quite probably be found to be a valuable confirmatory sign of one or other of these conditions, more especially of pneumothorax.

*Nature and Explanation of the Sign.*

Briefly, the observation consists in the fact of the existence in these cases of a markedly diminished blood pressure in the leg as compared with that in the arm on the same side, a difference usually of at least 10 mm., and in many cases of over 20 mm.

In normal persons the systolic arterial blood pressures taken simultaneously with due precautions in the arm and leg of the same side (the armlet round both limbs being at the same level) will be found to yield practically identical readings. On the other hand, in certain pathological states differences have been found, the leg reading being higher than that taken in the arm. Thus I have observed differences of this kind in high pressure cases associated with arterio-sclerosis,[1] and Leonard Hill has noticed them as a constant phenomenon in cases of aortic incompetence.[2] Differences in the opposite direction (in which the arm reading is higher than the leg one) doubtless exist under conditions in which there is obstruction to the circulation in the lower extremities, but so far, except in the class of case with which this paper is concerned, I have found only two definite instances: one in a girl aged 15 years, suffering with advanced pulmonary tuberculosis, in whom the leg reading was lower than the arm one by from 12 to 13 mm., the other in a male infant aged 2½ years (diagnosis uncertain), in whom a similar difference varying between 15 and 20 mm. existed. In neither of these cases was there an opportunity of making a post-mortem examination, so that the explanation of the phenomenon in them remains in doubt.

In regard to the explanation of the sign dealt with in this paper it will be remembered that anatomically the pleura on each side, more especially on the left, comes into relation with the descending thoracic aorta as it lies on the vertebral column, and I would suggest the most obvious cause to be that when the pleural cavity is distended with liquid or with gas pressure upon the aorta takes place, such pressure causing to a greater or lesser degree corresponding diminution in systolic pressure distally to the compressed

[1] O. K. Williamson: Clinical Observations on the Influence of the Vessel Wall on (so-called) Arterial Blood-Pressure Readings, Proc. Roy. Soc. Med., May, 1909.

[2] Leonard Hill: The Measurement of the Systolic Blood Pressure in Man, "Heart," vol. 1., No. 1.

area. This explanation would be the same as applies in some cases of diminution of the sphygmometer reading in one upper extremity as the result of pressure by the sac of an aneurysm.

In one or two young children with pleural effusion whom I have examined for the sign I have not found it to be present to a marked degree. Perhaps this may be explained by the fact that the chest walls are less rigid in these than in older subjects. Thus, an intrathoracic pressure which in the case of the adult would exercise compression upon the aorta would in the young child be partly dissipated by the yielding chest walls, and would therefore fail to interfere to the same degree with the aortic blood pressure. Accordingly these cases in young children are not included in my series. Further, I have not included effusions in which there are higher leg readings resulting from thickened arteries or aortic incompetence.

The method of observation has been as follows:—

The patient has been at rest in bed, so that the armlet used for the leg reading and that for the arm have both been at the level of the heart. The Riva Rocci type of instrument was used, an Oliver's armlet of width 12 cm. being placed round the upper arm, and another one round the calf of the same side. Both armlets were connected by means of a three-way tube with the same pump and manometer. One observer took the systolic reading in the radial artery, the other in the dorsalis pedis or posterior tibial, and for alternate observations the two observers changed about so that the one who had previously taken the arm reading now took the foot one, and *vice versa*, the object of this procedure being to eliminate any personal equation. The readings taken were those obtained on letting the air out of the armlets after inflating them to a degree greater than necessary to obliterate the pulse in both limbs. The results are recorded in mm. of mercury.

*Results of Observations.*

These results show distinct differences in five out of the six cases of pneumothorax, and in five out of the seven cases of pleural effusion. In the former the differences are considerable, the average works out at exactly 16½ mm., and in three of these cases the figure reaches a height ranging from 23 to 27 mm. In the cases of pleural effusion the average difference works out at 12½ mm., and in one it actually reaches a figure of 35 mm. The details of the cases examined are as follows. Corresponding observations (on right or left side, as the case may be) on the same line were made simultaneously.

**No. 1. Male, aged 23 years. Left hydro-pneumothorax. Bell sound, succussion splash, heart displaced.**

| Feb. 12th, 1913. | | | Feb. 19th, 1913. | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 122 mm. | 104 mm. | 18 mm. | 122 mm. | 114 mm. | 8 mm. |
| 120 mm. | 118 mm. | 2 mm. | 112 mm. | 116 mm. | −4 mm. |
| 122 mm. | 100 mm. | 22 mm. | 112 mm. | 110 mm. | 2 mm. |
| 124 mm. | 112 mm. | 12 mm. | | | |

**No. 2. Male, aged 24 years. Left pyo-pneumothorax, pulmonary tuberculosis. Succussion splash, heart displaced.**

| Dec. 1st, 1915. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 122 mm. | 90 mm. | 32 mm. | 112 mm. | 100 mm. | 12 mm. |
| 114 mm. | 84 mm. | 30 mm. | 124 mm. | 104 mm. | 20 mm. |

**No. 3. Male, aged 19 years. Artificial pneumothorax (right), pulmonary tuberculosis.**

| Dec. 22nd, 1915. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 134 mm. | 136 mm. | −2 mm. | 134 mm. | 172 mm. | −38 mm. |
| 140 mm. | 130 mm. | 10 mm. | 156 mm. | 144 mm. | 12 mm. |

**No. 4. Male, aged 34 years. Artificial pneumothorax (left), pulmonary tuberculosis.**

| Feb. 2nd, 1916. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 108 mm. *circa* | 85 mm. | 23 mm. | 98 mm. | 83 mm. | 15 mm. |

**No. 5. Female, aged 17 years. Artificial pneumothorax (right), pulmonary tuberculosis.**

| Nov. 8th, 1916. | | | | | |
|---|---|---|---|---|---|
| Left arm. | Left leg. | Difference. | Left arm. | Left leg. | Difference. |
| 112 mm. | *circa* 60mm. | 52 mm. | 113 mm. | 92 mm. | 21 mm. |
| 110 mm. | 115 mm. | −5 mm. | 112 mm. | 80 mm. | 32 mm. |
| 112 mm. | 60 mm. | 52 mm. | 118 mm. | 103 mm. | 15 mm. |

**No. 6. Female, aged 20 years. Left pneumothorax, pulmonary tuberculosis. Marked signs of pneumothorax, heart displaced.**

| Feb. 13th, 1917. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 115 mm. | 85 mm. | 30 mm. | 112 mm. | 98 mm. | 14 mm. |
| 112 mm. | *circa* 60 mm. | 52 mm. | 110 mm. | 95 mm. | 15 mm. |
| 112 mm. | 83 mm. | 29 mm. | 115 mm. | 100 mm. | 15 mm. |
| 110 mm. | 100 mm. | 10 mm. | 114 mm. | 70 mm. | 44 mm. |
| 112 mm. | 85 mm. | 27 mm. | | | |

| Feb. 27th, 1917. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Right arm. | Right leg. | Difference. |
| 120 mm. | 90 mm. | 30 mm. | 120 mm. | 95 mm. | 25 mm. |
| 120 mm. | 86 mm. | 34 mm. | 115 mm. | 83 mm. | 32 mm. |

**No. 7. Male, aged 16 years. Right pleural effusion.**

| June 10th, 1912. | | | June 17th, 1912. | | |
|---|---|---|---|---|---|
| Left arm. | Left leg. | Difference. | Right arm. | Right leg. | Difference. |
| 138 mm. | 110 mm. | 28 mm. | 138 mm. | 100 mm. | 38 mm. |
| 130 mm. | 90 mm. | 40 mm. | 132 mm. | 100 mm. | 32 mm. |
| 128 mm. | 83 mm. | 45 mm. | 128 mm. | 90 mm. | 38 mm. |
| 130 mm. | 83 mm. | 47 mm. | 132 mm. | 120 mm. | 12 mm. |

**No. 8. Male, aged 12 years. Left pleural effusion. Signs very slightly marked.**

| Feb. 2nd, 1916. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Right arm. | Right leg. | Difference. |
| 95 mm. | 98 mm. | −3 mm. | 97 mm. | 98 mm. | −1 mm. |

**No. 9. Female, aged 50 years. Left pleural effusion. Signs slightly marked.**

| March 31st, 1916. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 114 mm. | 97 mm. | 17 mm. | 109 mm. | 103 mm. | 6 mm. |
| 121 mm. | 97 mm. | 24 mm. | 107 mm. | 106 mm. | 1 mm. |

**No. 10. Female, aged 31 years. Left pleural effusion. Signs of effusion marked, heart displaced.**

| August 30th, 1916. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 123 mm. | 121 mm. | 2 mm. | 115 mm. | 115 mm. | Nil. |
| 144 mm. | 115 mm. | 29 mm. | 124 mm. | 123 mm. | 1 mm. |
| 130 mm. | 115 mm. | 15 mm. | | | |
| 140 mm. | 115 mm. | 25 mm. | | | |

**No. 11. Male, aged 15 years. Pleural effusion. Signs slightly marked.**

| Sept. 6th, 1916. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 132 mm. | 128 mm. | 4 mm. | 130 mm. | 134 mm. | −4 mm. |
| 127 mm. | 105 mm. | 22 mm. | 127 mm. | 119 mm. | 8 mm. |
| 128 mm. | 127 mm. | 1 mm. | | | |
| 128 mm. | 119 mm. | 9 mm. | | | |

**No. 12. Male, aged 17 years. Left pleural effusion. Signs of effusion marked, heart displaced.**

| Oct. 20th, 1916. | | | | | |
|---|---|---|---|---|---|
| Left arm. | Left leg. | Difference. | Left arm. | Left leg. | Difference. |
| 105 mm. | 92 mm. | 13 mm. | 105 mm. | 90 mm. | 15 mm. |
| 111 mm. | 90 mm. | 21 mm. | 111 mm. | 93 mm. | 18 mm. |

On Oct 23rd 35 ounces of fluid removed from left pleural cavity.

**No. 13. Male aged 15 years. Left pleural effusion. Signs of effusion marked; heart displaced.**

| Oct. 25th, 1916. | | | | | |
|---|---|---|---|---|---|
| Right arm. | Right leg. | Difference. | Left arm. | Left leg. | Difference. |
| 104 mm. | 92 mm. | 12 mm. | 87 mm. | 60 mm. | 27 mm. |
| 100 mm. | 85 mm. | 15 mm. | 98 mm. | 80 mm. | 18 mm. |
| 96 mm. | 85 mm. | 10 mm. | 92 mm. | 93 mm. | −1 mm. |
| 100 mm. | 92 mm. | 8 mm. | 92 mm. | 92 mm. | Nil. |
| | | | 95 mm. | 95 mm. | Nil. |

On Oct. 26th 2½ pints of fluid removed from left pleural cavity.

I have to thank my colleagues for allowing me to examine cases under their care; also Dr. C. D. S. Agassiz, Dr. C. G Whorlow, Dr. I. Bastow, Dr. H. Davies, Dr. J. R. Earp, Dr. A. E. P. Parker, Mr. Carpenter, and Mr. Unwin for kindly assisting me in carrying out the observations.

Bryanston-street, W.

# SUSCEPTIBILITY TO CEREBRO-SPINAL FEVER IN RELATION TO AGE.

BY ARTHUR COMPTON, B.A., M.B. (R.U.I.), D.Sc. (N.U.I.),

CAPTAIN, R.A.M.C. (TEMPORARY); OFFICER IN CHARGE MILITARY BACTERIOLOGICAL LABORATORY, DORSET DISTRICT; ASSISTANT, IMPERIAL CANCER RESEARCH FUND, LONDON; FORMERLY RESEARCH ASSISTANT, INSTITUT PASTEUR, PARIS.

IN continuation of our studies into the etiology of cerebro-spinal fever we have been led to investigate the most susceptible age for the appearance of the disease. Theoretically, as will be seen presently, the question is of considerable interest in its bearing on etiology. Practically, it is also of importance, in view of the fact that many diseases are to-day recognised as showing age incidence, the latter often playing a prominent part for the clinician in the differential diagnosis of numerous conditions.

For the purpose of the present study we have taken data, collected by ourselves, arising out of the epidemics of 1914–15 and of 1915–16 in the Dorset Military District.

With regard to the epidemic of 1914–15, of 31 cases (civil and military) of the disease, about whom accurate information as to age is available, the age-distribution is as follows:—

| Age. | Cases % | Age. | Cases % |
|---|---|---|---|
| 5 to 10 years. ..... | 3·22 | 30 to 35 years. ..... | 9·68 |
| 10 ,, 15 ,, ..... | 4·84 | 35 ,, 40 ,, ..... | 6·45 |
| 15 ,, 20 ,, ..... | 22·58 | 40 ,, 45 ,, ..... | 1·61 |
| 20 ,, 25 ,, ..... | 37·10 | 45 ,, 50 ,, ..... | 4·84 |
| 25 ,, 30 ,, ..... | 6·45 | Over 50 ,, ..... | 3·23 |

On plotting the percentage of cases as ordinates, and the corresponding age-periods as abscissæ, these numbers give the graphical representation of Fig. 1. This figure shows

that for the epidemic of 1914–15, so far as the Dorset District is concerned, the *apparent* most susceptible age is between 20 and 25.

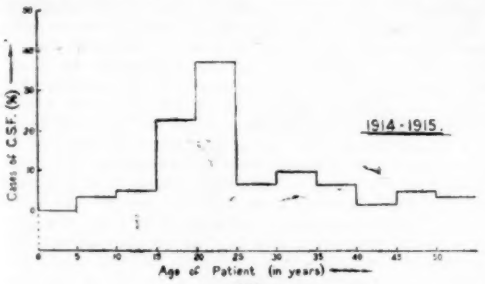



FIG. I.

In regard to the epidemic of 1915–16, of 62 cases (civil and military) occurring in the district from the beginning of July, 1915, to the end of June, 1916, their distribution in terms of age is as follows:—

| Age. | Cases % | Age. | Cases % |
|---|---|---|---|
| Under 5 years ..... | 1·61 | 30 to 35 years ..... | 4·03 |
| 5 to 10 ,, ..... | 1·61 | 35 ,, 40 ,, ..... | 2·42 |
| 10 ,, 15 ,, ..... | 0·0 | 40 ,, 45 ,, ..... | 3·22 |
| 15 ,, 20 ,, ..... | 28·22 | 45 ,, 50 ,, ..... | 1·61 |
| 20 ,, 25 ,, ..... | 43·55 | Over 50 ,, ..... | 0·0 |
| 25 ,, 30 ,, ..... | 13·71 | | |

On graphical representation these numbers give the curve of Fig. II. This figure shows that the *apparent* most susceptible age is between 20 and 25, in which age-period nearly 50 per cent. of the cases occurred. In this particular the finding for 1915–16 confirms that of 1914–15; indeed,

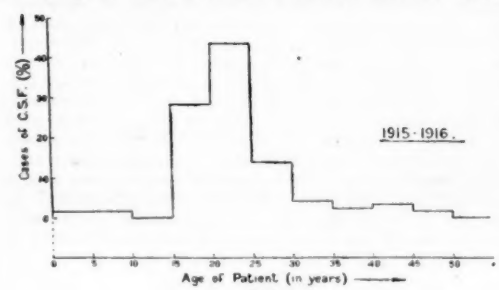



FIG. II.

the parallelism between the two curves is very striking. This age, it will be noticed in passing, corresponds to the military age.

In order to get the *real* most susceptible age, and at the same time to generalise the above finding, the percentage number of cases for each age-period requires to be referred to the percentage number of people of that age-period living in the district at the time.

To get a rough approximation to the latter I have taken the combined statistics of the contacts, 914 in number, of the 31 cases (1914–15), and the contacts, 2109 in number, of the 62 cases (1915–16)—dealt with by the laboratory[1]—and arranged them in terms of age-periods. Table I. sets out the result:—

TABLE I.

| Age-period. | No. of contacts. | % Age-distribution. | Age-period. | No. of contacts. | % Age-distribution. |
|---|---|---|---|---|---|
| Under 5 | 6 | 0·20 | 30 to 35 | 325 | 10·75 |
| 5 to 10 | 13 | 0·43 | 35 ,, 40 | 233 | 7·71 |
| 10 ,, 15 | 17 | 0·56 | 40 ,, 45 | 141 | 4·66 |
| 15 ,, 20 | 614 | 20·31 | 45 ,, 50 | 85 | 2·81 |
| 20 ,, 25 | 982 | 32·48 | Over 50 | 53 | 1·75 |
| 25 ,, 30 | 554 | 18·33 | | | |

Now, if we arrange the 93 cases of the disease, to which the above numbers appertain, in corresponding age-periods, and refer the percentage number of cases in each age-period to the percentage age-distribution of that period we get Table II.

[1] Associated, as laboratory staff, with me in connexion with these contact examinations have been: A/Sgt. J. W. J. Leighton, B.Sc. Lond., R.A.M.C. (T.); Corpl. H. L. Smith, R.A.M.C. (T.); Ptes. G. Blunt, T. Dakin, and E. Wigg, of the R.A.M.C.

TABLE II.

| Age-period. | Total No. of cases in the district during 1914–15 and 1915–16. | % Cases. | % Cases. / % Age-distribution. | |
|---|---|---|---|---|
| Under 5 | 0 + 1 = 1 | 1·08 | 1·08 / 0·27 | 5·40 |
| 5 to 10 | 1 + 1 = 2 | 2·15 | 2·15 / 0·43 | 5·00 |
| 10 ,, 15 | 1·5 + 0 = 1·5 | 1·61 | 1·61 / 0·56 | 2·87 |
| 15 ,, 20 | 7 + 17·5 = 24·5 | 26·34 | 26·34 / 20·31 | 1·30 |
| 20 ,, 25 | 11·5 + 27 = 38·5 | 41·40 | 41·40 / 32·48 | 1·27 |
| 25 ,, 30 | 2 + 8·5 = 10·5 | 11·29 | 11·29 / 18·33 | 0·61 |
| 30 ,, 35 | 3 + 2·5 = 5·5 | 5·91 | 5·91 / 10·75 | 0·55 |
| 35 ,, 40 | 2 + 1·5 = 3·5 | 3·76 | 3·76 / 7·71 | 0·49 |
| 40 ,, 45 | 0·5 + 2 = 2·5 | 2·69 | 2·69 / 4·66 | 0·58 |
| 45 ,, 50 | 1·5 + 1 = 2·5 | 2·69 | 2·69 / 2·81 | 0·96 |
| Over 50 | 1 + 0 = 1 | 1·08 | 1·08 / 1·75 | 0·61 |
| — | 31 + 62 = 93 | 100·0 | — | — |

In reckoning the number of individuals occurring in a given age-period those appertaining to the ages which limit the period are counted both ways—e.g., if there were 15 cases of 20 years of age 7·5 would be referred to the period 15–20 and 7·5 to the period 20–25. This is the explanation of the decimals in Column 2.

On plotting the ratios of column 4, in above table, as ordinates and the corresponding age-periods as abscissæ we get the curve of Fig. III. A glance at this figure suffices to see that for the present epidemic the *real* most susceptible age is under 5 years—that is, during infancy and early childhood, while there is a marked falling off of cases after adolescence is passed and adult life is reached; indeed, the least susceptible age would appear to be between 35 and 40.

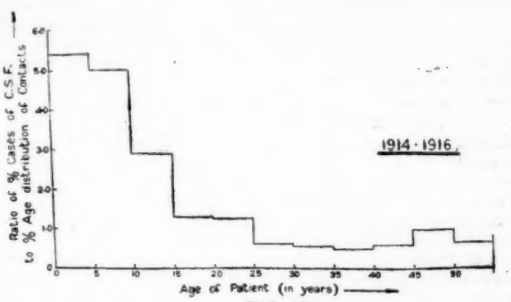



FIG. III.

It is interesting to note that this result establishes the parentage of the present epidemic with that of former epidemics in this and other countries, children in other epidemics, according to most observers, having been noted to be most susceptible to the disease.

But, in addition, the result is of interest from the point of view of etiology. My studies in connexion with the disease in the Dorset district during 1914–15 led me to formulate the hypothesis that cerebro-spinal fever is a weather disease, outbreaks being associated with sudden saturation of the atmosphere by water-vapour, combined with equable conditions of temperature—the meningococcus being about.[2] This hypothesis has been further developed and confirmed by my studies of 1915-16.[3] On this theory the increased facility with which, in the case of the child "carrier," the meningococcus traverses the naso-pharyngeal mucous membrane barrier to enter the system and invade the meninges can easily be explained by the greater fragility and delicacy of the naso-pharyngeal mucosa of the child.

[2] Report to the War Office—Medical Research Committee—of August 2nd, 1915 (Jour. R.A.M.C., November, 1915, pp. 546–570; THE LANCET, 1916, i., 255).

[3] Report to the War Office of Oct. 16th, 1916 (not yet published).

# Reviews and Notices of Books.

*Diagnosis and Treatment of Surgical Diseases of the Spinal Cord and its Membranes.* By CHARLES A. ELSBERG, M.D., F.A.C.S., Professor of Clinical Surgery at the New York University, &c. With 158 illustrations, three being in colour. London and Philadelphia: W. B. Saunders Company. 1916. Pp. 330. Price 21*s.* net.

Professor Elsberg has written a useful book, based on personal experience, dealing with the diseases of the spinal cord and its membranes which may require surgical interference. It is, however, not merely an excellent handbook for the surgeon; it contains material of clinical interest for neurologist and physician. In the first of the three sections of the book, the author is faced with the inevitable problem of how to allot space to spinal anatomy, physiology, and symptomatology. That adequate knowledge of these is essential to diagnosis goes without saying, but how far the surgeon is willing to operate where and as the physician indicates, how far he is keen to make, and capable of making, his own differential diagnosis, are matters which vary with the individual. Professor Elsberg is of those who hold that successful neurological surgery depends on having a working knowledge of organic neurology, but in spite of the general value of the chapters dealing with the factors in diagnosis, it would not be difficult to show that diagnostic problems not infrequently face the neurologist which could scarcely be solved were he to rely only on the information there supplied. The author makes the general statement that if the diagnosis is uncertain and the possibility of a remedial spinal disease cannot be excluded, an exploratory operation may be justified. We hear much of "giving the patient the benefit of the doubt," yet the engendering of false hopes by the mere fact of exploration is to be sedulously avoided, for most neurologists have had cases where operation has aggravated the mischief.

Part II. deals with the surgical technique of spinal operations, and includes lumbar puncture. Part III. deals seriatim with the "surgical diseases" of the spinal cord and membranes. It is instructive to learn that Professor Elsberg has operated with advantage in such conditions as hæmatomyelia, syringomyelia, and even spinal gliosis, making decompressive incisions in the cord. He has also divided the ventro-lateral tracts in the cord for persistent pain of organic origin in the lower parts of the body. Such operations may appear to be rather heroic, and not a few who are familiar with the pathology of these conditions will be unimpressed by some of the author's more sanguine statements. Yet we are in agreement with him in holding that where we are dealing with incurable diseases we are justified in attempting at least a modicum of relief.

The general get-up of the book is excellent; the illustrations are beautiful, and the diagrams satisfactory. While it contains matter that is controversial, and while some of the contentions advanced may be far from meeting with the approval of neurologists or other neurological surgeons, Professor Elsberg is to be complimented on the publication of a contribution to the subject that is both stimulating and instructive, not least in its progressive spirit and the possibilities which it suggests for the future development of the science and art of neurological surgery.

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*The Secretion of the Urine.* (*Monographs on Physiology.*) By A. R. CUSHNY. London: Longmans, Green, and Co. 1917. Pp. 241. Price 9*s.* net.

THE writer of a monograph on the secretion of urine is faced with a difficult task. The difficulty lies in the enormous literature of the subject, in the apparently incompatible nature of much of the evidence, and in the fact that the interpretation of their results has so often been influenced by the predilection of the observers in favour of a particular theory as to the secretion of urine. Professor Cushny is to be congratulated on his achievement in writing this monograph, which for the first time, we believe, presents a dispassionate and critical review of the literature, appraises the value of the more important of the investigations, and places the fundamental features of the problem before the reader in a clear and comprehensive fashion.

After stating the view of Bowman and Heidenhain, and briefly considering some modifications of their theory, the author puts forward the view—which he calls the "modern" view—that the capsule filters off the non-colloid constituents of the plasma, and that the tubules absorb water, sodium chloride, and small amounts of other substances, the composition of the absorbed fluid approximating to that of Locke's fluid. Some of the crystalloid constituents of the plasma are filtered off in proportion to their absolute amount in the plasma, and are called *no-threshold* bodies; others are known as *threshold* bodies, since they are excreted by the capsule only when their percentage in the plasma exceeds a certain value. The striking feature of this theory is the denial of secretory powers to any part of the kidney, and the limitation of the vital activity of the cells of the tubules to the absorption of a fluid of constant composition. In succeeding chapters the evidence for and against the Bowman and Heidenhain theory is critically examined, more especially Heidenhain's experiments on the secretion of dyes, and also the many observations on the frog's kidneys. The conclusion is drawn that Heidenhain's experiments are invalid, and that for various reasons the experiments on the frog's kidney do not furnish decisive proof of the secretory function of the tubules. The author then proceeds to develop the "modern" view and to show how it explains the effects of changes in the blood-supply and of diuretics upon the amount and composition of the urine. The last chapters are devoted to glycosuria, albuminuria, and nephritis.

There is no doubt that the author's view of the process by which urine is formed is logical, and that it affords an adequate interpretation of the majority of the established observations on the kidney; it is particularly convincing as regards diuretics. Further, it was perhaps to be expected that when absorption by the tubules had been definitely established the pendulum would swing in its direction to the complete exclusion of secretion. In our opinion, however, the evidence in favour of secretion by the frog's kidney is too strong to be disregarded, and it is necessary to admit the occurrence, or at least the strong probability of the occurrence, of secretion by the tubules, although possibly to a comparatively limited extent or in special circumstances. This possibility, indeed, is recognised by Professor Cushny. However this may be, Professor Cushny's broad and impartial survey of the whole subject marks a considerable advance towards the solution of the problem, and cannot fail to be of the utmost value to future workers.

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*The Causation of Sex in Man.* By E. RUMLEY DAWSON, L.R.C.P. Lond., M.R.C.S. Eng. Second edition. With 22 illustrations. London: H. K. Lewis and Co. 1917. Pp. 226. Price 7*s.* 6*d.* net.

IN reviewing the first edition of this work we pointed out that in many instances the attempts which have been made to solve the complex problem of the causation of sex have been made with an absence of that scientific precision which is essential if we are ever to arrive at the truth. In the second edition of his book Mr. Rumley Dawson, who claims to prove that male ova come exclusively from the right ovary and female ova from the left ovary, and, further, that the two ovaries ovulate alternately and in regular rotation, entirely ignores all the recent work which has been done on this subject. He takes no interest in the numerous and accurate observations on the causation of sex in the lower animals, even though some of them lend a little support to his view, inasmuch as they tend to prove that the sex is already determined in the ova before they are expelled from the ovary. He brings forward every so-called fact which in his opinion tends to prove his hypothesis, and ignores or tries to explain away all those which are opposed to it. For instance, the not uncommon example of a run of children of the same sex preceded or followed by one child of another sex he conveniently accounts for by assuming the presence of a unilateral sterility!—a condition in the case of a fertile woman extremely uncommon and in the case quoted entirely unproved. If, instead of quoting cases in which he states his prognostications have been successful, the author had published a consecutive series of fully recorded cases, including both his failures and successes, we should be inclined to place more reliance on his so-called proofs.

## *The Combined Treatment of SYPHILIS.*

# SUPSALVS

## STABLE SUPPOSITORIES OF "606" (OF FRENCH MANUFACTURE)

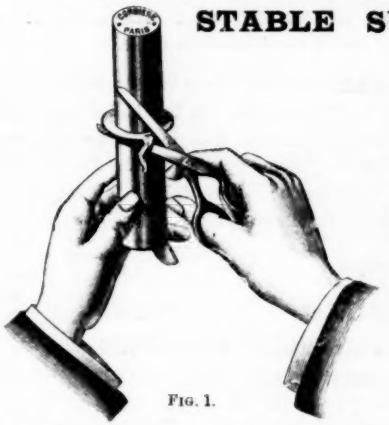


FIG. 1.

Fig. 1 represents the special patent metallic envelope containing a Supsalv for hot climates. The projecting edge in the middle is cut by scissors—the two ends are then easily pulled apart. The envelope should first be immersed in cool or iced water for 10 minutes.

At the International Congress of Medicine Ehrlich stated that the biochemical action of **"606"** on spirochætes is not direct but indirect, a third factor found in the body fluids being necessary.

This success is explained by the well-known experiment of Levaditi: "If living treponemas be placed in a solution of Arsenobenzol (Ehrlich's 606) they continue to live in it. But if a trace of extract of liver be added to the mixture the treponemas are destroyed."

"If 606 has to be taken up and transformed **by the liver** in order to become toxic to the treponema, there is no better mode of absorption of the drug than **by way of the intestine**, since all the **veins of the intestines** join the **portal vein**. If this be the case no route could be more indirect and more unsatisfactory for active treatment than one that is not intestinal or not intravenous (i.e., prehepatic), since some of the drug must necessarily become fixed everywhere before the passage through the liver has activated it."—Dr. Sabouraud, La Clinique (13-4-1913).

As a result of numerous clinical experiments, Dr. Bagrov, of Moscow, has arrived at the same conclusion, and recommends the rectal method of administration of 606.

**200** cases were treated by the combined treatment in one of the London hospitals. In each case a negative reaction was attained.

**Extremely Simple in use.**

**No Ill-effects.**

**Most Satisfactory Clinical Results.**

**Rapid Absorption.**

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***FOR MERCURIAL INUNCTION IN CONNECTION WITH SUPSALVS TREATMENT.***

**CHEMISTRY.**—**"Mersalv"** contains *10 per cent. metallic mercury*, which by a special mechanical process exists in the minutest state of sub-division possible. It is a *non-greasy* preparation, and, in contra-distinction to other mercurial preparations, contains no organic fats or oils. **"Mersalv,"** is of a white creamy consistence, of pleasant odour, and *cleanly in application*.

IN SPECIAL GLASS STOPPERED BOTTLES FOR HOT CLIMATES.

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**Recurrent Fever, SYPHILIS, Frambœsia and Sleeping Sickness.**

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FORMS:

| DILUTE. (INTRAVENOUS). | CONCENTRATED. (INTRAVENOUS). | INTRAMUSCULAR. |
|---|---|---|
| GALYL is supplied in neutral tinted glass ampoules, containing the necessary dose of Sodium Carbonate, sterile distilled water only being used for the dissolution. | A special outfit containing 1 dose of GALYL, 1 ampoule sterilised solution, and 1 small filtering tube. DOSES: 0·10—0·15—0·20—0·30 0·35—0·40. | GALYL is supplied in Oily Emulsion. DOSES: 0·10—0·15—0·20 0·30—0·40. |

**GALYL is now tested in accordance with the requirements of the L.G.B.**

**3000** injections (intravenous) were given in one of our **Service Hospitals.** "No case has given the slightest cause for anxiety and the clinical results are very satisfactory." *Staff Surgeon's Report.*

# BIOSULFOL

***(Assimilable Colloidal Sulphur.)***

**A GREAT ADVANCE IN SULPHUR TREATMENT.**

Sulphur administered in this form by the digestive tract **is entirely absorbed** (90% in worst cases and 100% in others).

**Biosulfol** gives beneficial results, with which ordinary Sulphur medication, owing to its being only in a small part assimilated, cannot compare.

***INDICATIONS:***

**Skin Diseases.**
**Chronic Affections of the Pharyngeal and Bronchial Mucous Membrane.**
**Chronic Affections of the Genital Mucous Membrane.**
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**Various Affections of the Joints.**
**Intestinal Intoxication.**
**Mercurial and Lead Poisoning, &c.**

***DOSAGE:***

**Biosulfol** is prescribed in a one-teaspoonful dose, to be taken during each of the two principal meals, pure or in water or milk. It is quite palatable.

*LITERATURE ON REQUEST.*

THE ANGLO-FRENCH DRUG CO., LTD., GAMAGE BUILDING, HOLBORN, LONDON, E.C. 1.

Telephone: HOLBORN 1311. (Late M. BRESILLON & Co.) Telegrams: "AMPSALVAS, LONDON."

**Antipyrin, Phenacetin, and Pyramidon superseded.**

# CRYOGENINE

LUMIÈRE.

**NON-TOXIC. EFFICACIOUS. HARMLESS.**

Adopted by the French Ministries for War and the Navy, also by the Poor Relief Board. Papers on "Cryogenine" have been read before various Medical Societies by over 90 of the most eminent Continental Medical Men. In each paper clinical results of the most satisfactory character are recorded. "Cryogenine" is a white crystalline powder, odourless and almost tasteless; its chemical composition is Metabenzamido semi-carbazide.

**Cryogenine** has a high reputation as a

**GENERAL ANTIPYRETIC and POWERFUL ANALGESIC.**

FORMS.—Tablets, Pills and Powder.

LANCET, Dec. 18th, 1909, p. 1812: "..... The above case is one out of a number of successful results obtained from the use of this remedy (Cryogenine) contrasted with Pyramidon, which certain writers regard as the best drug for phthisical temperature. I think there can be little doubt 'Cryogenine' is the safer and more efficacious antipyretic. ....."
J. H. G———, M.D.

# HEMOPLASE

**(LUMIÈRE).**

**Hemoglobin in its Natural State.—Iron in most assimilable form.**

**HEMOPLASE** is a protoplasmic extract from the blood corpuscles of healthy animals. It has had a very extensive and exhaustive clinical trial in a large number of cases (Dr. Gelibert alone reported to the International Tuberculosis Congress the results of 1250 injections), and given consistently excellent results.

***INDICATIONS:***

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**TUBERCULOUS AFFECTIONS**
**HÆMORRHAGE, &c.**

***Forms:***

In Ampoules for Intramuscular or Hypodermic Injection; also in Pills for Internal Administration. This HEMOPLASE in the dry state contains all the active principles of the liquid form.

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**The SCIENTIFIC TREATMENT of HAY FEVER and allied ailments.**

# KINECTINE

According to Dr. MOUNEYRAT, the discoverer of Galyl and Hectine (the widely adopted Salvarsan Substitutes).

*FORMULA:*

*Chlorhydrate of Quinine c. Hectine*—i.e., *Benzo-sulfone-para-amino-phenyl-arsenate of Quinine.*

**Non-toxic, produces no ill-effects.**

**Easily taken (tablets) and well tolerated.**

**Highly satisfactory clinical results:—**

**AS A PROPHYLACTIC AGAINST HAY FEVER, &c.**

**RAPID ABORTIVE ACTION IN THE INITIAL STAGES.**

**CURATIVE ACTION IN THE ADVANCED AND CHRONIC CONDITIONS.**

32

***Medical Treatment of CANCER.***

# CUPRASE

Cuprase is a colloidal Copper hydroxide which is obtained chemically by the reduction of Salts of Copper in the presence of Albumosic Acid. The numerous clinical reports from Doctors of repute in various countries give cases of a great variety. In all of these **pain has been eliminated,** and in a good percentage **cures are claimed,** and in no instance **any undesirable effects.** Its *easy application* (subcutaneous injections) places it within the reach of all practitioners. It *is not toxic.*

*Extract from Proceedings of the Royal Society of Medicine, February,* 1913.

Dr. George Herschell, comparing electric and chemical colloid copper, stated: "..... **Chemical colloid appears to give the best results.** In the following cases chemically prepared colloid was used. Experimentally it has been proved: (1) That particles of colloid copper can be demonstrated in the granulations of cancerous growths after two or three injections of the colloid; and clinically (2) **There is invariably great relief from pain;** (3) Appetite and strength return and the patient puts on flesh; (4) There is in many cases a diminution in the size of the tumour; (5) **The injections are absolutely non-toxic,** although in many cases an inflammatory reaction is manifested in the cancerous growths.

"As regards my own personal experience in the use of this method of treatment in addition to my own cases, I have had an opportunity of observing the effects in the practice of some of my medical friends, and in nearly all cases the progress of the disease appeared to be arrested."

# THE LANCET.

*LONDON: SATURDAY, JULY 7, 1917.*


## The Mesopotamia Report.

THE indictment of the Indian Government, and to some extent of the India Office, and of the general British conduct of Indian affairs which is contained in the Mesopotamia Report, is to receive notice in the House of Commons next week. In the House of Lords Viscount HARDINGE, the Viceroy of India during the commencement of the Mesopotamia campaign, has to some extent defended his own position; but as regards the breakdown of the medical arrangements for that campaign he made no more effective explanation than a confession that he had been misled by his subordinates. The report is very candid and clear and should be read by all our readers, even though they may have assimilated its essential messages from hearsay or the perusal of reprinted excerpts, because it is, among other things, a perfect exposition of the factors upon which effective medical and sanitary administration depend, and a revelation of the way in which those factors are habitually neglected. It is for this reason in particular that we return to the subject of the Report to-day. Medical men, military or civilian, experience extreme difficulty, when it is their duty to take control of their branch of some joint operations, if the superior controlling and directing powers are placed in a position in which no medical advice need be taken and no medical warnings need be heeded. Their presentiments are usually disregarded and their advice neglected. The essential qualities required of the medical men placed in this wise are necessarily foresight and courage—foresight to anticipate what will be the responsibilities falling upon their department, especially if events, over many of which they will have no control, do not progress favourably; and courage to insist upon attention to any requisition which they may make. And all demands from medical men upon a reluctant authority have to be proffered with a full knowledge of the personal advantage to be gained by remaining quiet, and sometimes with contempt for threats of the punishment that may be meted out to recalcitrant subordinates. In some centres of local government, especially in backward provincial towns, the medical officer of health could tell this story from out of his own experience; and there are still places where the man who has the foresight and courage to know what is wanted, and to ask for it, is treated by his local sanitary authority as a nuisance—as one who desires to bring the good name of the community into disrepute. Medical men are, unfortunately, used to this discreditable state of affairs in regard to domestic government, and have not been profoundly surprised to learn that the same miserable situation exists when the greatest interests are at stake. But to the public the whole story of the medical breakdown during the 1915–16 campaign in Mesopotamia has come as an appalling shock, and the blind neglect of medical precautions during the operations is seen to have been due, at bottom, to the fact that the Government of India took no heed of such matters, and looked favourably only upon officials who made no trouble.

The earlier part of the medical arrangements in Mesopotamia were fairly satisfactory, but this seems to have been greatly due to the fact that until the summer of 1915 no very severe strain was put upon medical administration. There was a low rate of sickness in the expeditionary force during the winter of 1914–15, and no battles occurred in which the casualties were so considerable that absence of a full medical personnel led straight to disaster. The defects in the care of the sick and wounded, which afterwards proved so lamentable, were existent during the opening phases of the campaign, but the dangers thus portended were not vividly realised, and there was no persistent representation on the part of the principal medical officer, Surgeon-General HEHIR, that the defects must be made good lest the horrors, which actually occurred later, should ensue. Then came the extension of military operations, the first substantial lengthening of the lines of communication being in May, 1915, up to which time there is evidence to show that, although there had been nothing in the medical administration that could be considered a breakdown, the snapping point in a strained cord was being reached. Surgeon-General HEHIR'S work had been very good, and its success had obscured his sense of the risks that were being taken; but what an efficient officer he was is proved by his strenuous work during the siege of Kut-el-Amara, which lasted 147 days. Surgeon-General HATHAWAY succeeded Surgeon-General HEHIR as principal medical officer to the expedition, and this officer appears to have completely misunderstood the position. Already at the battle of Kut-el-Amara the field ambulances were insufficient in number, the river transport used for evacuating the wounded proved unsuitable, the arrangements for clearing the battlefield were inadequate, and the hardships suffered were great. After the battle of Ctesiphon, which took place in November, 1915, there was, says the Mesopotamia Commission, a complete breakdown, and the circumstances which followed this battle were fully reported upon by a commission appointed by the Government of India to inquire into the medical arrangements in Mesopotamia. By this time the Government of India could not conceal from themselves what all the world knew—namely, that something desperately wrong in the medical machinery had displayed itself. The Commissioners selected were Sir WILLIAM VINCENT, Major-General BINGLEY, and Mr. E. A. RIDSDALE, and their report on the evidence placed before them revealed the medical establishment available for the expedition as quite inadequate to the demands made upon it. Their report is published in full as an appendix to the Mesopotamia Report, and the Mesopotamia Commission endorses substantially, having fuller evidence before it, the findings of

the earlier investigation. After the battle of Ctesiphon, when there were 3500 wounded, there were no proper methods of evacuation—indeed, the first hospital steamer appeared in the river in March, 1916, three to four months after that battle, and one year and five months after the campaign commenced. Yet on Dec. 7th, 1915, Sir JOHN NIXON telegraphed to the Secretary of State for India to say that the wounded had been satisfactorily disposed of, that their general condition was satisfactory, and that the medical arrangements in circumstances of difficulty had worked splendidly. It appears that this telegram was drafted by Surgeon-General HATHAWAY. This, indeed, was a terrible misuse of reticence, as the Commissioners term it, and ten days later a detailed report of the evacuation of the wounded from Ctesiphon was sent from which no one could have gathered that anything untoward had happened. A hushing-up policy was being pursued for as long as possible.

But this policy could not succeed indefinitely, for a large public, both at home and in India, knew something of the tragedy that had been enacted. Major CARTER, I.M.S., who was in medical charge of a hospital ship at Basra waiting for wounded from Ctesiphon, made an independent report contradicting the optimistic remarks of Surgeon-General HATHAWAY, and took thereby that grave risk of meeting with official disapproval which others dared not face—how real that risk was is sufficiently shown by the monstrous fact that for his independent action he was stigmatised as "a meddlesome interfering faddist" and threatened with arrest and degradation. This, to pass from the great imperial to the small local sphere, is exactly what happens to a medical officer of health who publishes in his annual report reflections on the apathy of a sanitary authority. The spirit is one that must be uprooted, and we trust that in the Mesopotamia Report will be found the necessary tools for eradication. We do not call for any penal sentences upon individuals involved in this sorry tale of misery unnecessarily inflicted upon men who were wounded and dying in their country's cause, but the Mesopotamia Report will have failed in its object if it does not make impossible such tragedies in the future. Where the medical arrangements of an expedition are in question the representations of scientific experience must be taken into proper account, and the medical officers in places of principal responsibility must know that their demands will be listened to with an anxious desire to meet them, instead of feeling that the less trouble they give the sweeter will their official life be. It emerges from the Mesopotamia Report that the executive medical officers, one and all, did their duty fearlessly—they suffered and died with the men; the fault lay with those supreme authorities who in times of peace had starved the Indian Medical Service, and who, when in charge of the military and political conduct of the war, sought no medical guidance, or having received it did not follow it, and whose attitude towards those who tried to impress upon them the medical aspects was one of resentment or apathy.

## The Economic Production and Distribution of Milk.

WE are glad to note that the Committee appointed in April by the President of the Board of Agriculture to inquire into the production and distribution of milk have issued an interim report dealing with the possible shortage of milk next winter. We agree with the committee that this aspect of the problem calls for immediate attention, as any difficulty in obtaining milk is a serious menace to child welfare. Later we may expect the Committee to deal with the complex problem in various aspects of maintaining milk production at its pre-war level, and we are sure that they should aim at an actual increase; but for the present it is well to speed up economical methods at once in order to avoid a shortage after the period of milk harvest is over. There can be little doubt that great economies could be soon effected if producers would fall into line.

The Committee state, for example, that the output of dried milk can be so increased as to add at least 50 per cent. to the supply. They find that there are in Great Britain some 30 or 40 installations for the manufacture of dried milk with an actual total output of between 2000 and 3000 tons, equivalent to some 450,000 to 675,000 gallons of liquid milk. Besides these, there are a large number of factories for the manufacture of condensed milk, and there is every reason for believing that at the present time these plants and factories are not all working to their fullest capacity. Here, surely, is a splendid opportunity for taking immediate steps to get the maximum output from all milk-drying and milk-condensing plants during the next few months. The Committee are satisfied that dried and condensed whole milk are useful and reliable substitutes for liquid milk, their main point for the present being to secure the preservation of milk and an increased store to provide against the times of shortage when they come. The general principle thus enjoined calls for little criticism, but it must be remembered that the various methods of preservation have their limitations as to the period over which the condensed product will last in a sound state. It is doubtful whether there is sufficient accommodation in refrigerators for keeping such products, the cold storage at present available being, we believe, fully employed for the preservation of other food products. Again, even milk condensed with a large percentage of sugar—this may amount to nearly 50 per cent.—is not guaranteed by the manufacturers to keep intact more than three months, while it is still more difficult to give a warranty of condition in the case of milk condensed without sugar. It may be remarked also that manufacturers who use sugar as a preservative will soon be deterred from so doing in consequence of the greatly advanced cost. Coming to completely dried milk, there would seem to be a bigger future for this product than for the condensed variety, assuming that satisfactory steps are taken to ensure its keeping sound over a reasonable time, but the fatty contents are prone

to get rancid unless the product is packed under special precautions. There is no difficulty in keeping dried skim (i.e., fatless) milk sound, but it is whole milk which the Committee have in mind, and it is the conservation of whole milk which is first in importance.

The report is only preliminary, but its publication may well be called timely owing to the urgency of the points which have been dealt with. There are three main directions in which the Committee propose that action should be taken, clearly realising the nature of the situation. First of all, the uncertainty and sense of insecurity which exist among dairy farmers, particularly in respect of prices, labour and feeding stuffs, should, in the Committee's opinion, be immediately reduced as far as possible. Then the surplus summer milk should be used to the best national advantage in ways which they indicate; and finally the loss of milk during the warm months of the year by waste or souring before it reaches the consumer should be reduced. We are much inclined to share the opinion of the Committee that in existing circumstances the sooner milk is available in a dried and soluble form the better. Then on the addition of water the powder is reconstituted as original milk, and its use has advantages for the community, not only of health but of economy and convenience.

# Annotations.

"Ne quid nimis."

## A WAR-TIME PATHOLOGICAL MUSEUM.

THE war-time museum continues to monopolise the time and energy of the entire Museum staff of the Royal College of Surgeons of England, and the Conservator, Professor Arthur Keith, F.R.S., in his annual report, just issued, narrates the history of this collection, undertaken at the request of the Director-General of the Army Medical Service, to which we have already briefly alluded.[1] Specimens came in at first very slowly, only 500 having been received at the date of the last annual report in June, 1916. But in the present year more than twice that number have been added, and there are now over 1500 specimens in the collection. A service was established under Lieutenant-Colonel T. R. Elliott, F.R.S., between the pathological laboratories attached to base hospitals and casualty clearing stations in France and the Museum of the College, and at a later date a similar service was arranged between the pathological departments of military hospitals at home and the Museum by Lieutenant-Colonel Sir John Bland-Sutton, who was appointed by the Army Council as its representative in the management of the collection. There was at first no intention of exhibiting the collection, and Professor Keith traces the genesis of this idea in the following terms:—

> Towards the close of 1916 it became apparent to all who realised the educative value which such a collection possessed for Army medical officers that its exhibition could not await the end of the war. Its historical value would remain unimpaired, but its present educative value would be lost. It was realised that it should be made available for study as soon as was possible. In July, 1916, the French Army medical staff opened a museum in Paris (at the Val-de-Grâce) for the exhibition of specimens of every kind connected with military surgery and hygiene. The Director-General of Medical Services in France asked Lieutenant-Colonel T. R. Elliott to visit and report on the Val-de-Grâce Museum. A favourable report was returned; it was found that the museum was enthusiastically supported and visited by officers belonging to all branches of the medical staff of the French Army; it served as a centre for the dissemination of the best available knowledge. The project of an immediate exhibition of military specimens was then taken up by the chiefs of the Medical Department of the Army at home and abroad. In December, 1916, the Army Council requested the Council of the College to suggest the best means "for placing on exhibition the collection of war specimens now assembled in the storerooms of the Museum." The Council of the College undertook to do the best it could. At its request Mr. S. G. Shattock, F.R.S., assisted by Mr. Cecil Beadles, undertook the selection and preparation of specimens for exhibition. In the selection of specimens of a surgical nature they were assisted by Captain Raymond Johnson, R.A.M.C. A nucleus for the exhibition was at once assembled in the hall of the Museum by Mr. Shattock. In this nucleus were assembled specimens which were chiefly derived from the museums of the College and of St. Thomas's Hospital Medical School illustrating the wounds of former wars—Peninsular, Crimean, Franco-Prussian, and South African. A section illustrating the lesions of the present war was also included. Drawings and photographs were added. To this modern section additions are being constantly made as the labours of Mr. Shattock and Mr. Beadles progress.

The aim of those who are responsible for the management of the collection is to have an extensive series of specimens for exhibition in the first week of October, 1917, to meet the needs of the medical officers of the Army. Although the scope is less wide than the collection at the Val-de-Grâce, the collection at the Royal College of Surgeons of England will include not only actual specimens of wounds of all parts of the body, and of the diseases and consequences of military wounds, but also samples of the missiles causing wounds, the various means of treatment adopted, and the results obtained so far as such results can be accurately represented by drawings, photographs, casts, and models. Mr. Shattock, who reports on the pathological department, states that at present there is a very full collection of gunshot injuries, both old and recent, available for examination and study. The valuable series of pathological drawings made by Mr. A. K. Maxwell in France will form part of the exhibition. Means and material for such a central or national exhibition offer no difficulty, but in the lack of skilled museum assistants Professor Keith sees a great hindrance to the carrying out of the scheme, and he concludes that, unless energetic measures are taken to remedy this deficiency, great difficulty will result in dealing with the mass of material now accumulated. We trust that the irksome delay may be capable of removal.

[1] THE LANCET, 1917, i., 116.

## THE DEBT OF MEDICINE TO THE DISCOVERY OF DYES.

IN a series of articles on Science and Industry, published in a supplement to last Saturday's issue of the *Manchester Guardian*, appears one by Dr. C. W. Saleeby on Dyestuffs in Medicine, in which the remarkable influence on the progress of medical science encouraged by the discovery of the coal-tar dyes is discussed. The subject is not in the least new to medical and scientific audiences, but it is none the less interesting. As we have often pointed out, the selective action of dyes on micro-organisms was a step of the utmost diagnostic value by adding to the efficiency of microscopic examinations, and now we are turning this selective action to account in the treatment of numerous infections. The dyes, in short, have laid the foundations of a system of chemico-

therapeutics which promises to be of distinct importance in combating some of the worst human ills. The discovery of a dye substance—e.g., such as acriflavine—which appears to discriminate between friend and foe, only attacking the latter, suggests the possibility of finding further selective substances which are inimical to the human organism, but destructive to the particular disease organisms which are known to have invaded the host. The possibility of successful treatment on these lines is real. Little could William Murdoch have conceived in 1792 when he distilled coal for the first time for producing gas for lighting his house—thus laying the foundations of the coal-gas industry—what great potentialities lay hidden in the distillation whose by-products now yield us such an astonishing stock of valuable synthetics, antiseptics, dyes, and explosives.

## THE CROONIAN LECTURES.

Colonel Adami's third Croonian lecture dealing with the agencies producing adaptation to disease in the higher animals commenced by drawing from the data brought forward thus far[1] the conclusions that bacteria are capable of being modified by alterations of environment of certain orders; that the modifications conform with Herbert Spencer's "direct adaptations"; and that not some, but all the microbes subjected to particular orders of alteration of environment exhibit the particular modifications; the hypothesis of "chance variation" in one direction with survival of the fittest is incapable of explaining the phenomena. After calling attention to two examples of direct adaptation in protozoa higher than the bacteria—namely, the conversion of negative into positive chemiotaxis in the myxomycete, Fuligo, and Musgrave and Clegg's observations upon the accustomance of Entamœbæ from the intestine to new bacterial and tissue foodstuffs, Colonel Adami pointed out that the multiplicity of studies of the last quarter of a century upon immunity afforded deep insight into the processes involved in direct adaptation in the higher animals, though no single biologist had dealt seriously with the significance of modern discoveries in relationship to adaptation and evolution. He adduced typical examples to demonstrate that immunisation of the individual is simply direct adaptation. The subjects are immunised so that they can withstand the lethal dose many times multiplied; the blood serum of the immunised animals contains bodies which neutralise the toxin; the cells of the body of the immunised animals elaborate and discharge the antitoxin in great excess over the amount of toxin originally introduced; and in some cases they elaborate this for weeks and months after the introduction of the toxin. What is this but acquirement of a new property which cannot possibly be regarded as the calling into activity of a property previously possessed? The acquirement is something positive, and there can be no alternative hypothesis of loss of inhibiting factors and no possibility of ascribing the new property to the persistence of a chance variation. Antiricin can be produced in rabbit or mouse with absolute certainty; there is here no alternative explanation of "the survival of the fittest," and a parallel is afforded by the production of diphtheria and tetanus antitoxins, the cells which absorb and fix the toxins producing the antitoxins. The more widespread bacteriolytic immunity developed against members of the typhoid-coli group, cholera spirilla, micrococci were held by Colonel Adami to be an acquired power of digestion of unfamiliar proteins. Colonel Adami concluded his third lecture by dealing with the question of the inheritance of acquired pathological conditions in the higher animals, and showed that we have precise evidence of such inheritance, direct and indirect, which fits in wholly with our routine medical experience of the danger of marriage in families where like nervous or other defects are exhibited. Instances of direct inheritance of acquirements are, and must be, rare and limited to cases in which the influences which, affecting the body cells, modify their internal secretions, and through these internal secretions so tell upon the germ cells and their metabolism as to set up similar defects and similar disorders of the internal secretions in the offspring; but we know, as a matter of fact, that the endocrine organs as a class have a profound influence upon the generative organs and upon growth, and, from general experience, that metabolic disorders—gouty and "rheumatoid" states, defect and excess of internal secretions—are heritable. The results of medical research strongly support Darwin's earlier contention that congenital variation is to be attributed to the action or influence of changed conditions upon the parental body, and through it upon the reproductive germs. At the same time they indicate the existence of a limited group of cases in which the Lamarckian principle is exemplified—namely, that of identical inheritance of conditions acquired by the parent. The concluding lecture of the series, which dealt especially with the physico-chemical basis of immunity and evolution, was delivered on June 26th, and will be published in full in THE LANCET shortly.

[1] THE LANCET, June 16th (p. 921) and 23rd (p. 951).

## EPSOM COLLEGE.

THE annual general meeting of the Governors of Epsom College was held at the office in Soho-square on June 29th. Sir Henry Morris, the treasurer, occupied the chair, and in submitting the annual report drew attention to the fact that the Council had been obliged to increase slightly the annual school fee charged to boys entering the College in Michaelmas term last year or subsequently. Since then, he added, the Council had been enabled to raise the salaries of the assistant masters, and they had also presented to each master an immediate bonus, and had instituted a "Provident Fund" for helping sons of medical men either during their pupilage at the College or on leaving school. We understand that £100 have already been allocated for this purpose, and that the Council would be glad to receive subscriptions to this end. We are glad to note that in spite of the war the numbers of the school have not gone down, and the usual athletic and social life of the place has been maintained as far as possible. Since the last annual general meeting J. M. Crombie has been awarded an exhibition in modern history at Christ Church, Oxford, 11 boys have passed the whole or a part of the First Examination for medical degrees of the University of London, and 10 have matriculated at the same University. The Forest Exhibition has been given to F. W. Black, the Armstrong Scholarship to J. M. Crombie, the Stone Scholarship to W. L. Martland, the Haviland Exhibition to A. F. McGlashan, and the Highett Scholarship to B. W. Roffey. The Jenks Memorial Scholarship was awarded by the Royal College of Surgeons of England to J. St. C. Shadwell. The St. Bartholomew's Hospital Scholarship was awarded to F. C. W. Capps, and the Middlesex Hospital Scholar

ship to E. T. Bailey. The report showed that over 650 Old Epsomians were serving with the forces, of whom 550 had joined one branch or another since the outbreak of the war. In the roll of honour of Old Epsomians were included 62 who had been killed in action, 8 who had died in hospital, 93 who had been wounded, 6 who were missing, and 4 who were prisoners. Captain A. Addenbrooke, who died from wounds, was a master at Epsom. Forty-five Old Epsomians have been mentioned in despatches, 2 three times, and 3 twice, 1 has been awarded the Victoria Cross, 7 the Distinguished Service Order, 1 the Distinguished Service Cross, and 20 the Military Cross. After the report had been adopted and formal business had been transacted a cordial vote of thanks to the chairman, moved by Sir James Reid and seconded by Sir R. Douglas Powell, was carried unanimously.

## A DEATH FROM SCURVY.

IN a report of Dr. A. K. Chalmers, the medical officer of health, submitted to a meeting of the Health Committee at Glasgow on June 27th, a death from scurvy was registered as occurring in one of the Poor-law hospitals of the city. The significance of the event being obvious in view of the present conditions of the distribution of food, Dr. R. M. F. Picken accordingly undertook an inquiry into the circumstances under which it had occurred. With the courtesy of the medical superintendents of Barnhill and Merryflatts Hospitals, he was able rapidly to collect the following history:—

Under normal conditions three or four cases of scurvy are admitted annually to each of the Poor-law hospitals. Since the middle of February, however, 50 cases have been admitted, distributed thus:—Feb. 15th to March 14th, 2 cases; March 15th to April 14th, 7; April 15th to May 14th, 15; May 15th to June 14th, 22; since June 15th, 4. The experience of these hospitals is that under ordinary circumstances in Glasgow the disease is confined to males, and the present outbreak preserves this feature. Not a single case in a female has been recognised. Moreover, the disease, so far as it has been recognised, appears to be occurring only in men who are dwellers in model lodging-houses, or who live alone, a fact which suggests indifferent attention to the selection and preparation of meals. The medical superintendent of Barnhill is of opinion that the origin lies in the recent shortage of potatoes, this being the only form of fresh vegetable food which this class of patients is accustomed to prepare. From Dr. Liston it was learned that the history of the Merryflatts patients conforms with this in more than half the cases, although in others it has been impossible to ascertain that any alteration in diet had occurred over a prolonged period before the onset of symptoms. Apart from the lodging-house population occasional cases would appear also to be occurring among the general community, and according to the superintendents of the Royal Western and Victoria Infirmaries several cases, seven in all, have been admitted for treatment since April, and one of these from a rural district near Glasgow.

Deaths from scurvy are now exceedingly infrequent in this country. In Scotland, in 1912, 4 were registered; in 1913, 3; and in 1915, 2; while in Glasgow during these years only 1 is known to have occurred. The facts as disclosed in the inquiry have a practical importance for the public at the present time. Potatoes have long been known to possess antiscorbutic properties. Their richness in starch has probably led to the too easy assumption that during the present scarcity an equivalent may readily be obtained from rice or other cereal also rich in starch. It was found, for example, that the Poor-law patients replaced the potato by bread, but neither bread nor rice has the antiscorbutic properties of the potato. These can most readily be obtained from fresh vegetables. All forms of fresh vegetables are valuable for the purpose, but cabbage has an established reputation for its antiscorbutic properties. Fresh vegetables, however, in one form or another are essential if the risk of scurvy is to be avoided, and where the ordinary forms are scarce a readily obtainable substitute, especially at the present time, may be found in the plentiful supply of young turnip plants which are being uprooted in singling, and which can readily be cooked much as spinach is cooked.

## RESEARCH DEFENCE SOCIETY.

THE annual meeting of this society has again been postponed owing to necessities of war, but a report has been issued dealing with the period between June, 1915, and the present time. Little propaganda work has been required, and neither in Parliament nor in the Law Courts has need arisen to defend research. The report, which is signed by Lord Knutsford as chairman, refers to the growing appreciation by the public of the great advances in preventive medicine which we owe to research, and the belief is expressed that in the years which are ahead there will be hardly any need for the sort of controversy in which the society has so often engaged in the years before the war, the best opportunities for usefulness being found not in dispute with antivivisection societies but in wide non-aggressive educational work. The effectiveness of the society's work has been greatly increased by the amalgamation with it of the Association for the Advancement of Medicine by Research. The address of the society is 21, Ladbroke-square, W.

## THE PANEL MEDICO-POLITICAL UNION.

THE Panel Medico-Political Union has issued its annual report, and the agenda at the annual meeting may be taken as a pronouncement upon the present shortcomings of the Insurance Acts from the point of view of a considerable body of panel practitioners. Suggestions were also made as to desired improvements, the proposals made varying in the degree of importance attaching to them, as well as in the practical probability of the demands made being acceded to. One of the resolutions before the meeting, for example, the carrying out of which would be the most acceptable and one, at the same time, which ought to be reasonably practicable, relates to the period of final settlement for the year's work. The resolution laid before the Union as to this was—

That the Commissioners should be urged to expedite the final settlement of sums due to practitioners, so that in no case it is delayed after the first quarter of the ensuing year. (Resolution I. B.)

It is difficult to believe that the making up of accounts with sufficient promptitude to ensure this end should be beyond the competence of the clerical staffs employed when peace is restored and when clerical staffs have returned to their normal duties. All matters of improvement involving extra work in large national undertakings not directly concerned with the great national undertaking of winning the war must, however, necessarily be delayed until that desired consummation be attained. There is more room for scepticism as to whether the next resolution (I. C) will receive the same consideration as the demand for prompt payment of earned money. The latter resolution asked—

That the Practitioners' Fund should be credited with interest at the rate of 5 per cent. on all moneys ultimately ascertained to be due to practitioners at, and outstanding after, 31st December of each year.

To charge interest upon money due in respect of medical practitioners' accounts from the date of

their becoming due is hardly customary in the case of general practitioners, and the financial position under the Insurance Acts will probably not be found to be such as would impel their administrators to generosity. Resolution I. E, asking that a subcommittee of the Union should report on the method of remuneration in rural areas, should lead to the removal of grievances affecting practitioners whose work differs widely from that of their urban colleagues. The demand in Resolution V. for a scheme of superannuation for panel practitioners suggests a leaning towards a system of, or approximating to a, State Medical Service, which is inconsistent with a desire to avoid State service believed to be generally felt by the medical profession. The observations made in the Panel Medico-Political Union's report upon the practical aspects of the proposed Ministry of Health in relation to insurance practice may be commended to the attention of panel practitioners as dealing with a subject upon which they are well entitled to form opinions and to make them known, and the same may be said with regard to the paragraph on p. 7 of the report upon "War Bonus or Increased Capitation Fees." The justice of the latter demand does not depend only upon the increased work devolving through war upon the panel practitioner, but also upon increased prices which have been met by large increases of the wages earned by the majority of his patients. If medical attendance for the working classes is recognised by Parliament as desirable, which the passing of the Insurance Act admits, it must also be recognised that reasonable remuneration is due to the medical practitioner in respect of the duties imposed upon him.

## WAR BREAD AND ITS FAULTS.

NUMEROUS complaints having arisen in many quarters as to the indigestibility and unwholesomeness of Government regulation bread, the Ministry of Food has appointed an expert committee to inquire into the matter. In a preliminary report issued this week the investigations, so far, appear to show that the bread made from this flour when properly baked is perfectly wholesome, but it is pointed out that there are unavoidable local variations in the flour used and in the methods of bread baking, and it is with points such as these that the committee are now dealing. We have received a communication on this subject from the Metropolitan Committee for War Savings. From this statement it appears that the complaints from the general public come under the following heads: (1) the bread is tasteless and quickly palls on the palate; (2) it is rough on the tongue; (3) it does not appear to be digestible and often produces symptoms of indigestion; (4) in children it has sometimes produced skin eruptions; (5) old people especially find it difficult to assimilate; (6) it often tastes musty and soon goes mouldy; (7) it becomes "sticky," and gummy (ropy bread); and (8) it soon becomes stale and uneatable. Practical suggestions dealing with these points with a view to improving G.R. bread refer to the desirability of obtaining a greater uniformity of qualities and properties in G.R. flour, to limiting the addition of other cereals, to eliminating husk, to reducing the mixed flours to a finer state, to improving the keeping qualities of the bread, to the importance of impressing upon the public the necessity of submitting the bread to thorough mastication, and, lastly, to the question whether in summer the restriction that bread must not be sold until 12 hours old should be suspended.

## THE LANCET, VOL. I., 1917: THE INDEX.

THE Index and Title-page to the volume of THE LANCET completed with the issue of June 30th will be ready in July. Owing to the continued shortage in the paper-supply, the Index will not be issued with all copies of THE LANCET, as was the custom prior to the War. Subscribers who bind up their numbers are requested to send a post-card to the Manager, THE LANCET Office, 423, Strand, London, W.C. 2, when a copy of the Index and Title-page will be supplied free of charge.

## TENTH REPORT ON PLAGUE INVESTIGATIONS IN INDIA.[1]

MANY valuable additions to our knowledge of plague have been made as the result of the investigations carried out in India under the direction of the Advisory Committee appointed jointly by the Secretary of State for India, the Royal Society, and the Lister Institute. Their reports are always eagerly awaited, and are studied with deep interest and also with much profit. The latest report, the tenth, has recently been issued as "Plague Supplement V." of the *Journal of Hygiene*.

One of the puzzling problems of plague in India is its unequal distribution in that country, and its incidence in some provinces has displayed the same inequality among constituent districts. In previous reports this subject has been partly dealt with, and in the present report a special study has been made of the unequal incidence of plague in the United Provinces of Agra and Oudh, by Majors T. H. Gloster and F. N. White, of the Indian Medical Service, in conjunction with Assistant Surgeons A. N. Mukharji, J. S. Roy Chaudhuri, and C. C. Mitra, along with Subassistant Surgeons G. C. Mandel and Manji Ram. Their investigations were begun in the early part of 1911, and their object was to elucidate several points of interest in connexion with the geographical distribution of plague, and with an endeavour to find an explanation of the variation in the degree of intensity of the infection exhibited by several districts in the United Provinces. After giving a general description of the area in question, its physical geography, climate, and population, a summary follows of the local epidemics of plague which have occurred during the decade ended in 1911. Four problems appeared to call for special investigation—namely: 1. Why does the city of Lucknow suffer less severely and less persistently from plague than the city of Cawnpore which is comparatively adjacent? 2. Can any explanation be offered as to why the district of Ballia is the most persistently and severely infected district in the United Provinces? 3. Why do the districts of the Bundelkhand—namely, Jhansi, Jalaun, Banda, and Hamirpur—suffer less severely from plague than the districts of the Gangetic Plain? 4. Can any explanation be offered for the unusually severe epidemic which occurred in the Muzaffarnagar district in 1906–7 and in the Muttra district in 1904–5?

### 1. *Plague in Lucknow and Cawnpore Compared.*

Lucknow, at the Census of 1911, had 259,798 inhabitants, including cantonment, while Cawnpore had 178,557. The causes suggested in the report for the greater incidence of plague in the latter town are: 1. It is a much more important trade centre than Lucknow and has more intimate trade relations with many infected places in India; it is thus exposed to greater risk of infection. 2. Cawnpore is a more rat-infested city than Lucknow, so that when plague infection has been brought to it the chance of the disease becoming permanently established is greater. 3. Cawnpore's extensive trade in grain, the construction of its houses, the density of its population, its narrow streets, and the customs of the inhabitants, living as they do in close

[1] Plague Supplement No. V., Journal of Hygiene; Tenth Report on Plague Investigations in India, issued by the Advisory Committee, May, 1917. The Cambridge University Press. Pp. 106, with Maps and Charts. Price 7s. net.

proximity to their grain stores and their domestic animals, bring a large section of the people into close association with rats, which convey the plague infection to them by means of infected fleas. 4. The number of fleas found on the rats in Cawnpore is larger than in Lucknow and attains a maximum at an earlier period in the plague season, thus favouring the establishment of infection at an earlier date.

2. *The Severity and Persistence of Plague in the Ballia District.*

Ballia has the unenviable reputation of being the most persistently and severely plague-infected district in the United Provinces, and closely related with this is the persistence of the disease through the non-epidemic season. This latter factor, it appears, may be correlated with (1) the observed high prevalence of fleas in June, July, and August; (2) the meteorological observations which show that in these three months, in 1911, the relative humidity in Ballia was higher than that recorded at any other station in the United Provinces, while Rurki and Gorakpur alone recorded lower monthly mean temperatures during this period. Although the investigators could find no constant relation between the climatic conditions and plague mortality in one district as compared with another, they show that within a given district the relative humidity during the epidemic season appears to influence the mortality, a high humidity during the winter months being associated with severe plague. The greater density of population in the Ballia district may also be favourable to the diffusion of the disease.

3. *The Smaller Incidence of Plague in the Bundelkhand.*

The Bundelkhand includes the districts of Jalaun, Jhansi, Hamirpur, and Banda, and forms a part of the Central India plateau. It is peculiarly liable to suffer from either an excess or a deficiency of rain. Taking the Jhansi district as representing the Bundelkhand, the reporters sum up the salient features of plague incidence in it as follows: (1) Epidemics have only occurred when the atmospheric humidity has been considerably above the normal percentage; (2) epidemics in Jhansi have coincided with epidemics in the Native States of Bhopal and Gwalior, such small imports of grain as are brought to Jhansi for local consumption being derived from those States; (3) it is noteworthy that in 1906–7, although the atmospheric humidity was high and plague was severe and widespread in other parts of the United Provinces, the Jhansi district escaped infection, together with the Central Indian Native States; and (4) the epidemic in Jhansi city in 1911–12 failed to spread throughout the district, although nearly three-quarters of the inhabitants had taken refuge in the surrounding villages. It is possible that this failure of plague to spread was due to the very dry weather which prevailed in March and apparently brought the epidemic rapidly to a close. Plague does not tend to spread in the Bundelkhand except in unusually humid years, very dry and hot climate being unfavourable to the prolonged existence of rat-fleas when separated from their host.

4. *The Severe Epidemics in Muttra and Muzaffarnagar.*

In the Muttra district in 1904–05 no fewer than 51,002 persons died from plague, giving the enormous death-rate from the disease of 66·8 per 1000 of the population. In the Muzaffarnagar district in 1906–07 there were 49.745 fatal cases, giving the very high plague mortality rate of 56 7 per 1000. In both of these districts the severe epidemics were associated with unusual humidity during the winter and spring months. The association of unusual humidity during the winter months in certain districts, with severe epidemics of plague, is so constant a phenomenon that the authors feel justified in concluding that one stands to the other as cause and effect. There are also grounds for believing that this cause exercises its effect mainly through its influence on the length of the life of rat-fleas when separated from their host, for the longer a rat-flea is able to survive in such circumstances the greater are its opportunities in an infected area for conveying the plague bacillus either to rats or man.

*The Influence of Saturation Deficiency and of Temperature on the Course of Epidemic Plague.*

Dr. Ralph St. John Brooks, of the Lister Institute, contributes a report in which he calls attention to the prompt decline of plague epidemics in Northern India with the onset of the hot weather, and he points out that this has led many observers to conclude that the establishment of a critical temperature is the most important factor in checking the course of the infection. The term "saturation deficiency" means the difference between the actual tension of aqueous vapour present in the atmosphere at the temperature in question and the tension of aqueous vapour that would be present in a saturated atmosphere at the same temperature. As a result of his own investigations Dr. Brooks forms the opinion that: 1. Plague does not maintain itself in epidemic form when the temperature rises above 80° F., accompanied by a saturation deficiency of over 0·30 of an inch. 2. Plague epidemics are rapidly brought to an end in the presence of a high saturation deficiency, even when the mean temperature throughout and after the termination of the epidemic has been considerably below 80° F. 3. Plague epidemics may commence and increase in intensity when the mean temperature is well above 80° F., provided that the saturation deficiency is below 0·30 of an inch. 4. In some districts in India, and in certain tropical islands, such as Java and Mauritius, where the climatic conditions are at all times of the year favourable to the incidence of plague, the disease may occur indifferently at all seasons. The adverse influence of high temperature and saturation deficiency may be explained by their effect on the duration of life of the rat-flea when separated from its host. Dr. Brooks's paper is illustrated with 18 charts; it is well worth study by all who are interested in the epidemiology of plague.

## NATIONAL BABY WEEK.

DURING the past week a special effort has been made by 200 or more towns and villages throughout the United Kingdom to draw the attention of the people as well as of the local authorities to the value of child life and to the need for doing everything possible to ensure a healthy motherhood and babyhood. In London the care of motherhood and infancy was made the text of addresses in many places of worship on the Sunday. On Monday the Queen opened an exhibition at the Central Hall, Westminster, illustrating in graphic way the essential features of infant welfare propaganda. At one of a series of important conferences held in the same hall the pension scheme for mothers as carried out in the United States was explained by Judge Neil, of Chicago. At the Guildhall, also on Monday, three Ministers of the Crown—Lord Rhondda, Mr. H. A. Fisher, and Mr. Hayes Fisher—addressed a representative gathering at which the Duchess of Marlborough proposed, and Mr. Ben Tillett seconded, a resolution pledging those present to use their influence to secure improved housing and sanitation, together with adequate provision in their own districts for the care of maternity and infancy. To-day (Friday) the best means of increasing the supply of practising midwives is the topic of a meeting held under the auspices of the Association for Promoting the Training and Supply of Midwives at 34, Queen Anne's-gate, Lord Balfour of Burleigh presiding; the speakers include Dr. E. W. Hope, medical officer of health of the city and port of Liverpool. The subject of housing also claimed the attention of a representative meeting at Brighton, when the mayor compared the town to a ragged garment with a golden fringe. Behind its beautiful sea-front Brighton had, he said, many ragged patches, and he trusted that after the war old houses would be pulled down wholesale. Sir Arthur Newsholme spoke at this meeting of the necessity for eliminating venereal diseases and for providing maternity homes for women who could not count on proper care at home during confinement. At Liverpool an elaborate programme was carried out during the week, an address being delivered by Sir Francis Champneys on the Promotion of the Welfare of Motherhood and Infancy.

QUEEN'S UNIVERSITY, BELFAST.—At the recent Final Examinations in the Medical Faculty of the Queen's University of Belfast two candidates obtained the M.D. degree. Twenty-nine entered for the M.B., and of these 19 passed. Miss M. Georgina Thompson (daughter of Dr. George Thompson, Bellaghy, co. Derry) was first of all the candidates, for which distinction she gained the £20 exhibition. She was also first in Midwifery, and was awarded the £30 exhibition, and first in Medicine, but as no candidate can hold exhibitions in more than one group this special prize in medicine was divided between Mr. C. J. A. Woodside and Mr. F. Hopkins. Mr. J. Lascelles was awarded the special exhibition in Surgery. First-class honours were given to Miss Thompson, Mr. Woodside, and Mr. Hopkins, and second-class honours to Mr. Lascelles, Mr. R. Meyer, Mr. G. V. Allen, and Mr. F. H. Whyte.

# Correspondence.

"Audi alteram partem."

## THE LUMLEIAN LECTURES AND MEDICAL RESEARCH:

### THE ACTION OF DIGITALIS IN AURICULAR FIBRILLATION.

*To the Editor of* THE LANCET.

SIR,—In my letter published in your issue of June 23rd I am aware that I was "asking for trouble," and am not surprised that Dr. T. Lewis has joined issue. Dr. Lewis assumes that I doubt the existence of auricular fibrillation, but as my letter dealt almost entirely with the effects of digitalis in auricular fibrillation in mitral stenosis I fail to see how he can have arrived at that conclusion. Indeed, I was induced to enter this controversy by Professor A. R. Cushny's interesting paper,[1] in which he pointed out that the action of digitalis in auricular filbrillation which occurs pathologically in man differs materially from that which is observed in the same condition induced experimentally in animals. The vagi being put out of court, the whole controversy turns on whether the beneficial action of digitalis in auricular fibrillation in mitral stenosis is entirely due to its action in producing a certain degree of heart-block. My contention is that mere slowing of the heart is an insufficient explanation of the marked improvement that follows, and that it is the action of digitalis in restoring the tone of the exhausted muscle so that it contracts more powerfully which plays a more important part than the cutting off of a certain number of stimuli from auricle to ventricle. The arguments I brought forward in favour of this were fully stated in my first letter, in which I laid stress on the serious disturbance of the hydraulics of the circulation resulting from mitral stenosis, which could not be rectified by mere slowing of the heart. Dr. Lewis entirely ignores these points, and in traversing my statement that digitalis is of value in heart failure associated with mitral incompetence he goes so far as to say, in speaking of its effects in auricular fibrillation, that "There is no comparable series in which, with a normal sequence of chamber contraction, digitalis has been shown to have a similar effect or, in fact, *any striking beneficial effect*." (The italics are mine.)

As Dr. Lewis will not accept my statements as to the value of digitalis in heart failure, let me quote Sir James Mackenzie,[2] who says of digitalis: "The condition of heart failure where it acts best is where there is dilatation of the heart with healthy *muscle fibres that have been exhausted in the endeavour to overcome abnormal resistance*. This effect is best seen in old rheumatic affections of the heart, but it may also be observed in other cases with a fair amount of healthy muscle." I think most clinicians will endorse this statement.

Dr. Lewis complains that I use the term "neurogenic" in connexion with the impulses transmitted by the narrow strand of specially differentiated muscle in the auriculo-ventricular bundle. Yet this plays so important a part in conduction and in the phenomena of heart-block that it subserves the function of a nerve rather than that of a mere muscle. Dr. Lewis also criticises my use of the unscientific colloquialism "pick-me-up," but I note that on the approach of "Baby Week" he waxes pathetic on his children being mauled and scolded by a childless neighbour, and himself thus lapses from the path of strict scientific phraseology.

In my first letter I made no personal attack of any kind, but simply wished to raise the question whether the beneficial effects of digitalis in auricular fibrillation could be attributed wholly to its producing partial heart-block and its action on the cardiac muscle be entirely disregarded. This is the point at issue.

I am, Sir, yours faithfully,

JOHN F. H. BROADBENT.

Seymour-street, W., July 2nd, 1917.

[1] THE LANCET, June 9th, 1917, p. 865.
[2] Heart Disease, first edition, p. 278.

## BENEDICT'S TEST FOR SUGAR IN THE URINE.

*To the Editor of* THE LANCET.

SIR,—I have lately had a number of complaints from medical men that they have been unable to obtain satisfactory results when testing urines for sugar with the Benedict solution supplied to them by the local chemists. On inquiry I find that in every instance the solution had been prepared according to the directions given in a trade publication, and that this solution is that described by Benedict for *quantitative* work, although the fact is not stated. It may be helpful, therefore, if I point out that Benedict's *qualitative* solution, employed in testing for sugar, is prepared as follows. With the aid of heat dissolve 173 grammes of sodium (or potassium) citrate and 100 grammes of anhydrous (or 200 grammes of crystallised) sodium carbonate in about 700 c.c. of distilled water. Dissolve 17·3 grammes of pure crystallised copper sulphate in about 100 c.c. of water. Cool the solutions to the room temperature, pour the second into the first, slowly and with constant stirring; make up to 1000 c.c. with distilled water.[1]

The difficulties of having two separate and distinct solutions for qualitative and quantitative work may be avoided by employing the modified Benedict solution and methods of estimating sugar in the urine and blood I recently described.[2]

I am, Sir, yours faithfully,

Nottingham-place, W., July 3rd, 1917. P. J. CAMMIDGE.

## ACUTE INTESTINAL OBSTRUCTION BY MECKEL'S DIVERTICULUM.

*To the Editor of* THE LANCET.

SIR,—In your issue of June 30th Lieutenant-Colonel E. Mansel Sympson records a case of acute intestinal obstruction by Meckel's diverticulum. Recently I operated on an infant seven days old for a similar condition. At birth the child had a patent Meckel's diverticulum protruding from the umbilical cord just beyond its attachment to the skin. The child passed flatus and the bowel acted through this abnormal opening and also by the natural passage. On the fifth day after birth the child commenced to vomit and gradually obstruction of the intestine became complete. On the seventh day the abdomen was opened. The small intestine (the ileum) was found to have invaginated itself into the Meckel's diverticulum, dragging with it the mesentery. This case is somewhat similar to that recorded by Lieutenant-Colonel Sympson, and would suggest a tendency in cases of Meckel's diverticulum for the ileum to pass into the diverticulum and cause intestinal obstruction.

I am, Sir, yours faithfully,

E. DRYBROUGH-SMITH, M.D. Edin.

Shebbear, Devon, June 30th, 1917.

## THE SIGNIFICANCE OF CAPILLARY MARKINGS IN PULMONARY TUBERCULOSIS.

*To the Editor of* THE LANCET.

SIR,—The evidence given by Dr. R. Crawshaw Holt respecting this phenomenon in THE LANCET of June 30th reads ambiguously. For example, he notes that of 351 individuals examined, 147 were between ages 6 and 14 years. Of these 147 who had fallen under suspicion of having tuberculous deposits in their lungs—so one gathers from the context—8 showed tubercle bacilli in the sputum. How does he classify the remaining 139?

Again, he speaks of "red" markings. Does he exclude those that are as distinctively blue? Curiously enough, the colour differs in different subjects. It is not uncommon to find only one of these little striæ. Does he class such as positive or negative?

Of the 63 which showed bacilli, which, therefore, his statements allow us to regard as indubitable instances, 40, or approximately two-thirds, showed no capillary markings. The observations being apparently uncontrolled, there is no

[1] Glycosuria and Allied Conditions, p. 33.
[2] THE LANCET, April 21st, 1917, p. 613.

basis for an inference that the remaining 23 showed these markings because they had pulmonary tuberculosis. It may have been so, but is not demonstrated by this evidence.

In a letter to THE LANCET of April 8th, 1916, I stated that the phenomenon in question is by no means rare in young people who give no proof or even suspicion of having intrathoracic tuberculous deposits.

I am, Sir, yours faithfully,

Liverpool, July 1st, 1917. EDMUND HUGHES.

*** Far more evidence is wanted before this matter can be usefully discussed further.—ED. L.

## RHUBARB LEAVES AND FLOWERS AS A VEGETABLE.

*To the Editor of* THE LANCET.

SIR,—The question of the use of rhubarb leaves as a vegetable having acquired some prominence of late in the public press, and certain cases of alleged poisoning as result of this use having been cited, the subject has become important, particularly at the present moment when it is our concern to enlarge rather than restrict the dietetic boundaries. For this reason I am anxious to draw attention to the points which follow, in the hope that they may contribute to the elucidation of the matter and amplify the comments which have already appeared in your columns (May 5th and June 2nd, 1917).

In Queen Elizabeth's time we read that "rhubarb leaves were used as a potherb and considered superior to spinach or beet," whilst "the use of the tender leaf-stalks is, comparatively, of modern date." From the same source we learn that in the *Gardeners' Chronicle* for 1846 the large globular pouch of unopened flowers, when dressed in the same manner as rhubarb, forms a "dish of great delicacy."[1] From another source[2] we gather that the Don Cossacks were accustomed to eat "the shoots and the leaves of Rheum rhaponticum, in springtime, in their soup, as a remedy efficacious against the scurvy." In King Henry VIII.'s time it appears that the common sorrel, *Rumex acetosa*, "was held in great repute" and used "as spinach or in salads."[3] This custom has prevailed down to the present day, especially in France.

Now both of these plants belong to the same natural order, Polygonaceæ, and both present an acidity which, in so far as the palate is concerned, must be counted among their virtues. This acidity is constituted in part by oxalic acid, free or more probably in combination, either as the acid potassium salt, $HKC_2O_4$, 2 Aq, or as the hyperacid quadroxalate, $HKC_2O_4$, $H_2C_2O_4$, 2 Aq. It is true that oxalic acid is present also in the tissues of rhubarb in another form, namely, in combination with lime as calcium oxalate, but this salt is so insoluble that to whatever extent it may occur in the leaves of rhubarb it can take no part in their acidity; indeed, we may consider that in this form the activities of oxalic acid are effectively cancelled. It is, however, necessary to remember that in the cooking of vegetables it is common practice to add soda to the water, and, soda salts in general being so soluble, it is reasonable to inquire whether in this way more of the oxalic acid present may not be extracted and become effective as soluble oxalate? But since, according to Fownes, the normal sodium oxalate is only slightly soluble, and according to Bernthsen it is the *least soluble* of the alkaline salts, both acid and neutral, we may put aside this interpretation of things as unlikely.

In the cases of alleged poisoning by rhubarb leaves already alluded to, the poisonous action has been attributed to the oxalic acid present. But the term poison has no significance apart from dose; reduce this sufficiently and, even in the case of the most virulent poisons, toxicity vanishes completely. What is the evidence from this quantitative point of view?

In a recent case of supposed death from rhubarb leaves[4] it was stated at the inquest that the leaves contained approximately equal parts of potassium binoxalate and of calcium oxalate, of each 10 grains in the pound of leaves—i.e., 10 grains of soluble or active oxalate, and 10 grains of insoluble or inactive oxalate; the latter may be dismissed as playing no part, for we remember that the antidote to oxalic acid poisoning is a lime salt. If, therefore, a whole pound of the leaves had been eaten, the effective poisonous dose in this instance will have been 10 grains, and if we regard a third of a pound as a fairly liberal helping, the lethal dose will have been reduced to one-third—say 3½ grains. But the smallest quantity of free oxalic acid, probably the most active form of all the oxalates, which is said to have been the cause of death in a boy of 16, is 60 grains, and, on the other hand, recovery has taken place after the swallowing of an ounce and a quarter.[5]

The state of the stomach, full or empty, is always an important element when estimating toxic action, which may be due to local or to systemic action (after absorption) or to both, but in the case in question, in which the rhubarb formed part of a meal, it must be clear that 3½ grains diluted by the contents of a full stomach could not cause any local damage to the mucous membrane, and that this dose, the eighteenth part of the minimal fatal dose, became lethal after absorption!

It must, then, be admitted that the evidence incriminating the leaves in this particular case is scarcely convincing. In conclusion, it may be added that in the writer's household the use of rhubarb leaves as a vegetable has been in common practice during the last three or four years and still continues. An undoubted laxative action attends this use, but this should be reckoned as virtue rather than as vice if the use be regulated accordingly.

I am, Sir, yours faithfully,

HARRINGTON SAINSBURY.

Wimpole-street, W., July 2nd, 1917.

[1] Cf. Lindley's Treasury of Botany, art. Rheum.
[2] Dictionnaire de Matière Médicale, Mérat et de Leus, 1834, art. Rheum.
[3] Lindley, op. cit., art. Rumex.
[4] See THE LANCET, June 2nd p. 847.

## THE MEDICAL DIRECTORY.

*To the Editor of* THE LANCET.

SIR,—The annual circular asking for information for the Medical Directory, 1918, was posted to members of the profession on July 3rd. We are anxious that those forms should be returned to us as promptly as possible. If in any cases the circular has not been received a duplicate will be sent on application. It is especially desirable that those practitioners whose addresses are included in the London Postal District should return the new district numbers. We are, Sir, yours faithfully,

THE EDITORS.

7, Great Marlborough-street, London, W., July 3rd, 1917.

## URBAN VITAL STATISTICS.

(Week ended June 30th, 1917.)

*English and Welsh Towns.*—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 17,000,000 persons, the annual rate of mortality was 11·7, against 12·8 and 12·4 per 1000 in the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 11·3, or 0·9 per 1000 below that recorded in the previous week; among the remaining towns the rates ranged from 4·4 in Enfield, 4·5 in Eastbourne, and 4·7 in Edmonton to 20·3 in Exeter, 20·6 in Rotherham, and 21·0 in Carlisle. The principal epidemic diseases caused 278 deaths, which corresponded to an annual rate of 0·9 per 1000, and included 148 from measles, 59 from infantile diarrhœa, 37 from whooping-cough, 22 from diphtheria, 7 from enteric fever, and 5 from scarlet fever. The deaths from measles showed a further decline compared with the numbers in the four preceding weeks, and caused the highest annual death-rates of 2·5 in West Hartlepool, 2·9 in South Shields, 4·5 in Middlesbrough, and 6·2 in West Bromwich. The 606 cases of scarlet fever and 1051 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 19 above and 16 below the numbers remaining at the end of the preceding week. Of the 3796 deaths from all causes in the 96 towns, 131 resulted from violence. The causes of 29 of the total deaths were uncertified, of which 6 were registered in Birmingham and 3 in Manchester.

*Scotch Towns.*—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death-rate was equal to 13·6, against rates steadily declining from 17·0 to 15·8 per 1000 in the six preceding weeks. The 296 deaths in Glasgow corresponded to an annual rate of 13·8 per 1000, and included 27 from whooping-cough, 24 from measles, 2 from diphtheria, and 1 from infantile diarrhœa. The 83 deaths in Edinburgh were equal to a rate of 13·0 per 1000, and included 5 from measles, 2 each from scarlet fever and whooping-cough, and 1 from diphtheria.

*Irish Towns.*—The 92 deaths in Dublin corresponded to an annual rate of 12·0, or 5·4 per 1000 less than that recorded in the previous week, and included 3 deaths from infantile diarrhœa and 2 from whooping-cough. The 94 deaths in Belfast were equal to a rate of 12·5 per 1000, and included 2 from enteric fever.

[5] Cf. Toxicological Manuals of Dixon Mann and of Witthaus.

Mrs. Lumley-Dann writes to say that "Mascot Day" has been abandoned, but small replicas of Captain Besley's 5000-year-old, pre-Inca mascot can be secured post free by sending half-a-crown to "Mascot," 1, Marylebone-passage, Wells-street, Oxford-street, London, W. 1. The proceeds go to a group of private hospitals, under the War Office, in need of assistance.

# The War.

## THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

*Killed.*

Capt. M. Greer, R.A.M.C., attached Royal Welsh Fusiliers, was educated at Liverpool University and qualified in 1907. He had held appointments at the Liverpool Stanley Hospital, at the Liverpool Dispensary, and at the Leeds Public Dispensary, and was in practice at Corris, Merionethshire, prior to joining the R.A.M.C.

*Died.*

Temp. Capt. F. C. H. Piggott, R.A.M.C., was educated at Cambridge and at St. Thomas's Hospital, London, and qualified in 1884. He was formerly assistant demonstrator to the professor of physiology at Cambridge and H.B.M. Acting Consul for East Soudan, and prior to joining the R.A.M.C. was in practice at Teignmouth, South Devon, where he was medical officer of health of the Union and Port Districts and held other appointments.

*Wounded.*

Capt. G. F. Fawn, R.A.M.C., attached Rifle Brigade.
Lieut. V. T. C. Bent, R.A.M.C., attached N. Staffs. Regt.
Lieut. J. S. Clark, R.A.M.C., attached Yorks Regt.
Lieut.-Col. R. H. L. Cordner, R.A.M.C.
Capt. J. L. Baskin, R.A.M.C., attached London Regt.
Capt. I. Campbell, R.A.M.C.
Capt. A. J. Smith, R.A.M.C., attached Middlesex Regt.
Capt. L. H. Skene, R.A.M.C., attached Royal Fusiliers.
Capt. A. E. Sutton, M.C., R.A.M.C.
Capt. C. N. Binney, R.A.M.C.
Capt. W. V. Corbett, R.A.M.C.
Capt. A. Juett, Australian A.M.C.

## CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported :—

Major R. R. B. Wall, Royal Field Artillery, killed in action, sixth son of the late Surgeon-General T. F. Wall.
Capt. and Flight Commander J. W. W. Nason, Royal Sussex Regiment and Royal Flying Corps, killed in action, son of the late Dr. C. St. S. R. Nason, of Gloucester.
Second Lieut. C. R. Barrett, Royal Field Artillery, died of wounds, second son of Dr. W. P. Barrett, of Folkestone.
Private P. G. Watson, Royal Berks Regiment, killed in action, eldest son of Dr. S. G. Watson, of Southsea, formerly of Brighton.
Major C. R. M. Young, Royal Garrison Artillery, died of wounds, eldest son of Dr. M. Young, J.P., of West Hartlepool.
Lieut. L. S. Bowman, King's Own Royal Lancaster Regiment, and Royal Flying Corps, killed in action, only son of Dr. R. O. Bowman, of Ulverston, Lancs.

## THE MESOPOTAMIA REPORT.[1]

**The Mesopotamia Report, published at the end of last week, is issued at the accessible price of 2s., and has already received such wide notice in the daily press that all our readers may be assumed to be familiar with its general findings. Nothing in the Report has moved the public more than the revelation of the circumstances of the medical breakdown which occurred in the latter part of 1915, inflicting the most terrible suffering on the sick and wounded, whose numbers were so greatly increased by the extension through Kut-el-Amara to the vicinity of Bagdad of our lines of operation.**

**The following are the findings and conclusions of the Commission in respect of the treatment of the sick and wounded and the medical provision generally :—**

The medical provision for the Mesopotamia campaign was from the beginning insufficient; by reason of the continuance of this insufficiency there was a lamentable breakdown in the care of the sick and wounded after the battle of Ctesiphon and after the battles in January, 1916; there was amelioration in March and April, 1916; but that since then the improvement has been continual until it is reasonable to hope that now the medical provision is satisfactory.

The defects of medical provision caused avoidable suffering to the sick and wounded, and during the breakdown in the winter of 1915–16 this suffering was most lamentably severe.

The deficiencies, which were the main causes of the avoidable suffering of the sick and wounded, were in the provision of the following: (*a*) river hospital steamers; (*b*) medical personnel; (*c*) river transport; (*d*) ambulance land transport. To these fifth and sixth main causes may be added in respect to the operations in January, 1916: (*e*) The absence of the medical and supply establishments of the 7th Division; (*f*) the premature efforts to relieve Kut in consequence of the erroneous estimate of supplies in that place.

As to personal responsibility the Vincent-Bingley Commission[2] found: "That a grave responsibility for that part of the suffering which resulted from avoidable circumstances rests with the senior medical officer of the force, Surgeon-General G. H. Hathaway, and with General Sir John Nixon, the general officer commanding the force, from April 9th, 1915, to January 19th, 1916. General Hathaway did not represent with sufficient promptitude and force the needs of the services for which he was responsible, and in particular failed to urge the necessity for adequate and suitable transport for the sick and wounded with that insistency which the situation demanded. General Nixon did not, in our opinion, appreciate the conditions which would necessarily arise if provision for the sick and wounded of his force were not made on a more liberal scale." We endorse the finding as regards Surgeon-General Hathaway who in our judgment showed himself unfit for the high administrative office which he held. We may add, however, as regards river and land transport, that while it was the duty of Surgeon-General Hathaway to urge its necessity, it was actually the duty of the Quartermaster-General's department and of Sir John Nixon's staff to see that it was provided. So far as Sir John Nixon is concerned, however, we think that he was throughout solicitous as to the condition of the wounded. The main mistake he made was to rely too absolutely on the statements made to him by his Deputy-Director of Medical Service, Surgeon-General Hathaway; to that extent he may be blamed, but he stands, so far as responsibility is concerned, in a very different position from that occupied by Surgeon-General Hathaway.

The officer directly responsible for the deficiencies of medical provision in Mesopotamia is, however, the Director of Medical Services, India. This appointment was held at the beginning of the war by Surgeon General Sir William Babtie, who held the office between March, 1914, and June, 1915 but was away from India for six weeks in February and March, 1915. He was succeeded by Surgeon General J. G. MacNeece on July 8th, 1915, and the latter proceeded home on sick leave on April 15th, 1916. Sir William Babtie in his evidence before us impressed us as an officer of ability and knowledge, but we do not think that he brought these qualities sufficiently to bear upon the task before him. He accepted obviously insufficient medical provision without protest and without any adequate effort to improve it. He cannot, therefore, be held blameless. Surgeon-General MacNeece did not give evidence before the Vincent-Bingley Commission, but he appeared before us. He was, in our opinion, an officer thoroughly desirous of fulfilling the duties assigned to him; but he was a man of advancing years and diminishing strength, unequal to the position he was called upon to fill, and his administration appears to us to show no signs of the vigour and efficiency that were required.

We find that (*a*) the Home Government agreed with the Indian Government in limiting the general military preparations of India before the war in the interests of retrenchment, and provision was accordingly not made for such an expedition as that to Mesopotamia. The limitation of medical preparation and the low standard of medical treatment in the Indian Army at the outbreak of war were the natural outcome of this policy, which was pursued for many years and was in force right up to the date of the war. (*b*) The private letters of the Secretary of State to the Viceroy showed an earnest and continuous anxiety as to the condition of the wounded, and the only comment that can be made upon the Secretary of State's procedure is that he did not fully utilise the official powers at his disposal for the purpose of forcing at an earlier period an investigation into the treatment of the wounded in Mesopotamia. (*c*) To Lord Hardinge of Penshurst, as Viceroy, belongs the general responsibility attaching to his position as the head of the Indian Government, to which had been entrusted the management of the expedition, including the provision of medical services. In regard to the actual medical administration he appears to us to have shown throughout the utmost goodwill, but considering the paramount authority of his office his action was not sufficiently strenuous and peremptory. (*d*) A more severe censure must be passed upon the Commander-in-Chief, for not only did he, as Commander-in-Chief of the Army in India, fail closely to superintend the adequacy of medical provision in Mesopotamia, but he declined for a considerable time, until ultimately forced by the superior authority of the Viceroy, to give credence to rumours which proved to be true, and failed to take the measures which a subsequent experience shows would have saved the wounded from avoidable suffering.

There has been misuse of official reticence as to medical defects and the sufferings of the sick and wounded.

While the protective and sanitary work of the Medical Administration has in certain directions and at some periods (notably under Colonel Hehir) been commendable, yet there has not been generally sufficient promptitude in taking the precautions dictated by modern science for the protection of the troops against disease.

Throughout the campaign (with insignificant exceptions) the executive and regimental medical officers and personnel have devoted themselves with unremitting kindness, zeal and industry to the care of the sick and wounded with such means as were at their disposal.

**Commander Wedgwood's separate Report, wherein it differs from the Report of the Commission, adds nothing to our knowledge of the medical arrangements in Mesopotamia.**

## THE CALLING UP OF MEN CLASSIFIED AS BIII. OR CIII.

**A circular from the Local Government Board suggests that some misapprehension has occurred with regard to an Army Council Instruction recently issued as to men in**

[1] Report of the Commission appointed by Act of Parliament to Enquire into the Operations of War in Mesopotamia, together with a Separate Report by Commander J. Wedgwood, D.S.O., M.P., and Appendices. H.M. Stationery Office. 2s. net.

[2] This Commission, appointed by the Government of India, reported on the medical arrangements in Mesopotamia in June, 1916. The Report is published in full as an appendix to the Mesopotamia Report, in which its findings are substantially adopted.

medical categories B iii. or C iii. The instruction was issued to recruiting officers, and directed that, for the present, men in these medical categories are not to be called up or posted unless they are clerks or are following a trade useful to the Army. So far as tribunals are concerned, these bodies, says the circular, should deal with the cases of men in these medical categories in the ordinary course on their merits, in accordance with the directions already issued to them. In any case in which exemption is not justified and is therefore refused, the men will be available for the Army if they should be required, or may be used as substitutes.

### THE CARE OF THE WOUNDED: THE TAG SYSTEM IN THE RUSSIAN ARMY.

It may be of interest to our readers to know something about the tag system used by the Russian Army. The following tag, which measures 4 × 7 in., is tied around the neck of every wounded soldier as he leaves the regimental dressing station:—

*Front of Tag.*

No. .....

Rank .....
Company No. .....
Battalion No. .....
Regiment No. .....
Surname .....
Christian name .....
Father's Christian name .....
What doing when wounded .....
Nature of wound .....
Wounded, contusion, bullet .....
Shrapnel, piece of shell .....
Bayonet, sword .....
Head, breast, stomach, joint .....
Arm, leg (upper or lower) .....
Broken bone, bone not broken .....
Diagnosis .....

*Back of Tag.*

Date .....

First dressing station .....
Time of arrival .....
Arrival with or without bandage .....
Help rendered .....

Division dressing station .....
Time of arrival .....
Arrived with or without bandage .....
Help rendered .....

Division hospital .....
Time of arrival .....
Arrived with or without bandage .....
Help rendered .....

Evacuation station .....
Time of arrival .....
Time of departure .....
Help rendered .....

Sanitary train No. .....
When received .....
Taken to .....
Time of arrival .....

Name of hospital receiving .....
Time of arrival .....
What disposition was made .....

Discharged, well, on leave .....
Returned to regiment .....
To sanitarium .....
Army Investigation Bureau .....

REPRESENTATIVES of the Swiss Red Cross have recently been visiting prisoners of war camps in India.

THE RED CROSS EMBLEM IN INDIA.—The Red Cross emblem has hitherto been flaunted loosely in India, and an Ordinance has been published restricting its use to certain named societies such as the St. John Ambulance Association and its allied bodies.

RED CROSS GIFTS.—The gift of £7,500, which Major W. Napier Keefer, of Toronto, recently sent to the King, has been disposed of in the following manner: £2,000 to the Star and Garter Home, £2,000 to the Nurse Cavell Homes, £1,000 to the Auxiliary Hospitals for Officers' Department of the Pinewood Sanatorium, £500 to the Prisoners of War Central Fund, £1,000 to the Military Orthopædic Hospital, Dublin, and £1,000 to the Ulster Volunteer Orthopædic Hospital, Belfast. The King has also handed an additional £2,000 to the Joint War Committee of the Red Cross and Order of St. John for the treatment of sailors and soldiers suffering from deafness.

NEW WAR HOSPITALS IN INDIA.—The Raja of Ratlam has arranged to equip and maintain a war hospital of 38 beds at Indore for British troops.—The Parsis of Karachi have given the Parsi Institute, the Jehangir Kothari Hall, the Katrak swimming bath, and the entire grounds and premises of the institute to the military authorities for a hospital.

UNITED STATES HOSPITAL UNITS ON THE BRITISH FRONT.—It is announced that nearly 2,000 officers and other ranks of the United States Army Medical Service are at work in the British War zone.

A TECHNICAL SCHOOL FOR DISABLED SOLDIERS IN BOMBAY.—A technical school for disabled soldiers has recently been opened in Bombay. The institution is designed to serve a twofold object: artificial limbs will be fitted and the men will be instructed in their use; they will further be taught suitable occupations, so that they may not be encumbrances upon their relatives. The first part of this work will be under the supervision of Major L. Hirsch, I.M.S., who has already been engaged in similar duties in the Bombay War Hospital, and the cost of this teaching will be borne by Government.

# Obituary.

### CHARLES THEODORE EWART, M.D. ABERD.,

MEDICAL SUPERINTENDENT, LONDON COUNTY ASYLUM, CLAYBURY.

WE have received the following appreciation of the late Dr. C. T. Ewart from the pen of one who worked with him at Claybury on the close and intimate terms of official superior.

Clinical psychiatry has lost a devoted as well as an able and interesting personality by the death of Dr. Ewart. It is unspeakably sad that he should have been called away from the work of his life just as he was happily enjoying the climax of his ambition, for which he had long waited and which when at last attained he maintained with honour and the utmost credit—viz., the post of medical superintendent of the London County Council's large asylum at Claybury, with nearly 3000 beds, to which he was temporarily appointed only last September.

All who knew Ewart respected his loyalty, the love that he had for the work of tending upon the insane, his anxiety for their comfort and welfare, as well as his great reserve of perseverance and patience. It is not too much to say that no man was ever more respected by the staff, nor more loved by his patients for the special qualities which make a successful medical officer of a large institution. Those who knew him never failed to realise his great tenderness in speech and action, for sympathy was in the nether springs of his nature. He never turned a deaf ear to the most trivial complaint, even when made by the most unreasonable of his patients, and he readily gave an interview to the most unamenable and the most perturbing spirit. He regarded his patients as his friends, and he gave much of his time unstintedly to "interviews with friends" in order to reassure anxious relatives that the patient was receiving the best curative and remedial treatment. His sincerity always carried confidence and conviction.

He delighted in that introspective mental analysis which characterises so many Scotsmen, and his great pleasure was in a contemplative philosophy which sustained some religious, reflective, or mystical trend. He had initiative, original powers, and an inventive, suggestive mind; but he possessed the defects of his qualities. His calm, contented disposition, his mysticism (usually associated with a keen intellect), and his optimism militated against his achieving early success. He was self-resourceful and self-reliant, sympathetic, possessed a deep feeling of altruism with a most hopeful temperament, and had an imposing and pleasing presence; all these, combined with his refined intellect and good manner, made him a most popular and charming character.

Dr. Ewart was never keen to attend meetings. He was lost in a self-assertive crowd, and he loved so much more the personal touch, for he was the quiet scholar and he felt into the soul of things. He contributed on occasions to magazines and journals of varying standards, writing in the *Nineteenth*

*Century*, the *Westminster*, *Empire*, *Quest*, *Chambers's Journal*, and others, and he excelled in magazine articles rather than in contributions to medical literature because he had a passion for extending his sympathies beyond his special sphere. This lure of something more than was apparent in things made him search for the deeper realities, but in spite of his philosophic tendency he was practical in action. He was one of the earliest to draw official attention to the value of special industrial colonies for those afflicted with epilepsy, and he may be correctly described as the originator of the scheme adopted later by the London County Council when the colony for the insane epileptic was founded at Epsom. He was the first to institute the training of nurses in the London asylums upon the basis of a syllabus adopted by the St. John Ambulance Association, as a recognition of which he was elected an honorary life member of the association. He took the greatest interest in physical drill for mental patients, many of whom in asylums need some encouragement to perform muscular movements, especially those of a general, orderly, and sustained kind; and he was a firm believer in the maxim *mens sana in corpore sano*. He was an ardent naturalist, and loved the country with all its pursuits; he was a "plus" golfer, and well known at some of the principal links, a keen cricketer and football player, a good opponent at tennis, and a useful hockey hand; but owing to a football accident, which brought on a strained knee, he was obliged of late years to moderate his athleticism.

Dr. Ewart was the son of a judge of the High Court in Jamaica, and married whilst at Claybury a daughter of the late Mr. Abraham Flint, of Chigwell; she with a daughter are left to mourn the loss of a devoted husband and father. Last Easter he suffered from an abscess of the vermiform appendix, which was successfully treated in a nursing home in London, and on Saturday, June 16th, he was further operated upon in his home at Claybury for appendicitis. The writer saw him the day before he died, when the wound, owing to complications, was reopened and the abdomen re-examined. He was then calm, composed, and self-reliant, his only thoughts being for others. He died from exhaustion and shock four days after the operation, having for a few months only reaped the fruits of a too long deferred promotion. His remains were laid to rest by his own wishes near to the scenes of his long labours and with every mark of love and respect. He will be tenderly recalled by several present medical superintendents who were his colleagues at Claybury, as well as by many matrons of the institution, as a sincere and generous friend. R. A.-J.

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### FRANCIS HENRY KNAGGS, M.R.C.S. ENG.,

OPHTHALMIC AND AURAL SURGEON, HUDDERSFIELD ROYAL INFIRMARY AND HUDDERSFIELD WAR HOSPITAL.

Mr. F. H. Knaggs, who died on June 24th from pneumonia after a brief illness at the age of 56 years, was the third son of the late Dr. Samuel Knaggs, who practised for many years in Huddersfield. He was educated at the Huddersfield College and at Rossall, taking his medical course at Guy's Hospital, where he held appointments in the eye and ear departments, being later clinical assistant at the (Moorfields) Royal London Ophthalmic Hospital. After a term of two years as house surgeon at the Gloucestershire General Infirmary and Eye Institution he commenced general practice in 1889 with his father and steadily gained in reputation as a specialist in eye and ear affections. For several years he assisted his brother, Mr. R. Lawford Knaggs, in the ophthalmic and aural department of the Leeds Public Dispensary, and in 1905 became honorary surgeon to the recently created ophthalmic and aural department at the Huddersfield Royal Infirmary, to which his father was for many years senior honorary surgeon. His death thus breaks a connexion with that institution which had existed since its first establishment. From the date of its opening in October, 1915, Mr. Knaggs had been a civilian medical officer at the Huddersfield War Hospital, and in January last received a commission as temporary captain in the Royal Army Medical Corps. He leaves a widow and one daughter and a wide circle of friends to mourn their loss. Mr. Knaggs was formerly honorary secretary of the Huddersfield Medical Society, where he read a number of practical papers on ophthalmic subjects, some of which were published in our columns.

# Medical News.

UNIVERSITY OF MANCHESTER.—At examinations held recently the following candidates were successful in the subjects indicated:—

FINAL M.B. AND CH.B. EXAMINATION.

Mercy D. Barber, W. T. G. Boul, Hilda K. Brade, Frances G. Bullough, Kathleen L. Cass, Ruth B. Conway, Jacob Holker, Norman Kletz (distinction in Medicine and Surgery), E. N. P. Martland, A. B. Platt, Jacob Shlosberg, D. M. Sutherland (distinction in Medicine), and Harry Taylor.

*Medicine.*—C. F. J. Carruthers and Elizabeth C. Powell.

*Surgery.*—Elizabeth C. Powell.

*Obstetrics.*—C. F. J. Carruthers, J. C. T. Fiddes, and R. S. Paterson.

*Forensic Medicine and Toxicology.*—T. H. Almond, Sybil Bailey, Mary G. Cardwell, James Charnley, J. C. T. Fiddes, F. L. Heap, John Mills, Kathleen O'Donnell, M. C. Paterson, Harriet R. L. Reid, Norah H. Schuster, L. J. Schwartz, V. T. Smith, and Marie Wardman.

THIRD M.B. AND CH.B. EXAMINATION.

*Pharmacology and Therapeutics and Hygiene.*—Elizabeth C. Davies, Kathleen Doyle, Georgiana M. Duthie, Olive M. Gimson, F. G. Hamnett, Simon Kelly, J. N. Laing, J. G. Nolan, Olga G. M. Payne, Ellis Pigott, F. L. Pickett, Esme Ratner, William Reikan, Annie G. Thompson, Doris M. R. Tompkin, and Ruth A. Wilson (distinction in Hygiene).

*Hygiene.*—Mary E. Boullen (distinction), Percival Fildes, and Archibald Harris.

DIPLOMA IN DENTISTRY.

*Final Examination.*—T. F. Healey, James Kershaw, and C. H. Travis.

UNIVERSITY OF SHEFFIELD.—At examinations held recently the following candidates were successful:—

M.B., CH.B. DEGREES.

*Final Examination.*—Annie Clark, Ethel M. Mathews, and Winifred H. Wells (first-class honours and distinction in Medicine and Surgery).

*Third Examination.*—John V. Mainprize, Alice White, and Ethel White.

*First Examination.*—Mary P. Gell, Ronald D. S. Inman, Muriel R. Laycock, Elsa F. Paige, and Doris Pindar (distinction in Chemistry).

The Kaye Scholarship was awarded to Dorothy E. Mathews, and the Clinical Gold Medal to Winifred H. Wells.

UNIVERSITY OF DURHAM: FACULTY OF MEDICINE.—At the Convocation held on June 26th the following degrees were conferred:—

*Doctor of Medicine.*—William Hudson and Noel Florentine Rowstron.

*Doctor of Medicine for Practitioners of 15 years' standing.*—James Vere Arkle and Elgar Down.

*Bachelor of Medicine and Bachelor of Surgery.*—Percy Vernon Anderson, George Albert Clark, William Duncan, Ernest Craig Dunlop, Mortimer Jacob Hilton, Reginald Hunter, Charles Gordon Irwin, Harold Mason Leete, Phyllis Marriott, Freda Newman, Thomas Wilson Shaw, and Sadek Abdel Shehid.

The Diploma in Public Health was awarded to William Eric Roper Saunders.

At the Second Examination for the degree of Bachelor of Medicine the following candidates were successful:—

*Anatomy and Physiology.*—Tom Hugh Ronald Anderson, John Edmund Basham, Eric Cresswell Dagger, Kate Gray, B.A., Mary Louise Griffiths, Margaret Barbara Herbst, William Ewan Douglas Hodgson, Dorothy Holmes (second-class honours), Harold Holtby (second-class honours), Henry Norman Clarence Jaffé, Edith Catherine Morris Jones, Thomas Hobson Kirk, George McCoull, Maurice Myers, Thomas Swinhoe Severs, Joseph Silverston (second-class honours), Henry Rochester Smith, Alice Mary Stenhouse, James Stonehouse, Kathleen Mary Weldon Watts, Arthur Guy Weston, Edith Short Williamson, and Athelstan Woodman (first-class honours).

At the Third Examination for the degree of Bachelor of Medicine the following candidates were successful:—

*Materia Medica, Pharmacology and Pharmacy; Public Health; Medical Jurisprudence; Pathology and Elementary Bacteriology.*—Douglas George Patrick Bell (second-class honours), Dorothy Olga Sutherland Blair, Ernest Dewar Charles, William Devereux Forrest, Alexander Thomas Harrison, Patrick Hickey, Louis Lavine, Angus Hedley Whyte, and George Roebuck Woodhead.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—The following candidates passed the First Dental Examination:—

Daniel van der Merwe du Toit and Daniel Andries Marchand.

The following passed in the subject of Chemistry and Physics:—

Robert Mitchell du Preez and Thomas Bird Gregor.

The following passed the Final Examination and were granted the diploma L.D.S. R.C.S. Edin.:—

William Brownlee Watson and William Kerr, Edinburgh; Cayetano Bethencourt, Las Palmas, Canary Islands; and Andrew Francis Brigimen, Edinburgh.

METROPOLITAN HOSPITAL SUNDAY FUND.—The following are among the chief amounts received at the Mansion House to the end of last week:—

| | £ |
|---|---|
| Anon ... ... ... ... ... ... | 2,000 |
| Watts, Watts & Co.... ... ... | 315 |
| Lt.-Col. More Nisbett ... ... | 200 |
| Brixton Independent Church | 185 |
| Temple Church... ... ... ... | 135 |
| London and Brazilian Bank, Ltd. ... ... ... ... ... ... | 105 |
| United National Collieries ... | 105 |
| Eastern Produce and Estates Co. ... ... ... ... ... ... | 105 |
| Mr. W. D. Graham Menzies | 100 |
| Messrs. Erlangers ... ... ... | 100 |
| Lord Leverhulme ... ... ... | 100 |
| Lever Bros., Ltd. ... ... ... | 100 |
| Burmah Oil Co., Ltd. ... ... | 100 |
| Blyth, Green, Jourdain & Co., Ltd. ... ... ... ... ... ... | 100 |
| Sloper Bros. ... ... ... ... | 100 |
| Chappell & Co., Ltd. ... ... | 100 |
| Lord Somerleyton ... ... ... | 100 |
| St. Andrew's, Frognal ... ... | 88 |
| St. Marylebone Presb. Church | 80 |
| Roehampton Parish Church | 71 |
| Brompton Oratory ... ... ... | 68 |
| Lemsford Parish Church ... | 54 |
| Dulwich College Chapel ... | 53 |
| W. Gardiner & Co., Ltd. ... | 52 |
| Mr. Oscar S. Ashcroft ... ... | 52 |
| Anon. ... ... ... ... ... ... | 50 |
| Anon. ... ... ... ... ... ... | 50 |
| Mrs. Kenneth M. Clark... ... | 50 |
| Hoare, Miller & Co.... ... ... | 50 |
| Mr. G. P. Gooch ... ... ... | 50 |
| Mr. Russell D. Walker ... ... | 50 |
| Mr. Otto Beit ... ... ... ... | 50 |
| Miss M. S. Druce ... ... ... | 50 |
| E. Grey & Co. ... ... ... ... | 50 |
| H. J. S.... ... ... ... ... ... | 50 |
| A. and F. Pears, Ltd. ... ... | 50 |
| Mr. W. Morton Phillips ... | 50 |
| St. Matthew's, Bayswater ... | 50 |
| St. Andrew's, Lambeth... ... | 50 |
| Downe Parish Church ... ... | 43 |
| Christ Church, Watford ... | 42 |
| Chapel Royal, St. James's ... | 40 |
| Hayes (Kent) Parish Church | 40 |
| Stamford Hill Cong. Church | 39 |
| Orange Street ,, ,, | 37 |
| Paddington ,, ,, | 36 |
| Farm Street R.C. Church ... | 35 |
| St. Augustine's with St. Faith, E.C. ... ... ... ... | 34 |
| St. Mary's, Shortlands ... ... | 33 |
| St. John's, Blackheath ... ... | 32 |
| Streatham Cong. Church ... | 32 |
| Thomas & Cook... ... ... ... | 31 |
| St. George's, Southwark ... | 31 |
| Mr. W. E. Norton ... ... ... | 30 |
| All Saints', Blackheath ... ... | 30 |
| Cowley Parish Church ... ... | 30 |
| Tooting Wesleyan Church ... | 27 |
| Haslemere Parish Church ... | 27 |
| Cook, Son & Co. ... ... ... | 26 |
| Alexanders & Co., Ltd.... ... | 26 |
| Stapley & Smith ... ... ... | 26 |
| Ascension Ch., Blackheath... | 26 |
| Westminster Cathedral... ... | 25 |
| Chapel Royal, Savoy ... ... | 25 |
| Mitcham Parish Church ... | 25 |
| James Morrison & Co., Ltd.... | 25 |
| Miss Gabriel ... ... ... ... | 25 |
| Mr. Frank Chaplin ... ... ... | 25 |
| Mr. Harold Russell... ... ... | 25 |
| Chesterfield Tube Co. ... ... | 25 |
| Mr. W. Forster Brown ... ... | 25 |
| F. C. A. ... ... ... ... ... | 25 |
| St. Saviour's, Pimlico ... ... | 24 |
| Coldharbour Parish Church... | 23 |
| Wealdstone Parish Church ... | 22 |
| St. John's, Walthamstow ... | 22 |
| Messrs. Gladstone, Wyllie & Co.... ... ... ... ... ... | 21 |
| Harefield Parish Church ... | 21 |
| In Memoriam Crosby Lockwood ... ... ... ... ... ... | 20 |
| Miss E. C. Druce ... ... ... | 20 |
| Walker, Sons & Co., Ltd. ... | 20 |
| Miss Hunt ... ... ... ... ... | 20 |
| Mr. W. E. Manners... ... ... | 20 |
| Mrs. Christie Miller ... ... | 20 |
| Mrs. Eyres... ... ... ... ... | 20 |
| Avelino Aramayo & Co.... ... | 20 |
| Lord Leith of Fyvie... ... ... | 20 |
| St Thomas's, Clapton ... ... | 20 |
| Northwood Presb. Church ... | 20 |
| Wilmington Parish Church... | 20 |
| Muswell Hill Wesleyan Ch.... | 20 |
| Carmelite Ch., Kensington... | 20 |
| A Camp "Somewhere in France"... ... ... ... gns. | 2 |

The total already available for distribution amounts to about £22,000.

THE MCQUITTY EXHIBITION.—The McQuitty Exhibition at the Royal Victoria Hospital, Belfast, for clinical work, has been awarded to Miss Georgina Thompson. The prize was founded as a memorial to the late Dr. W. B. McQuitty, a distinguished member of the medical staff.

THE TREATMENT OF CHOLERA IN CALCUTTA.—The official minutes of the Calcutta Corporation, recently received, record the arrangements made for the treatment of cases of cholera among the poor by medical inspectors of the Corporation, as follows:—

During the cholera epidemic of 1916 the health officer consulted Sir Leonard Rogers and reported that the modern treatment of cholera involves estimations of blood pressure, specific gravity of the blood, &c.; that the technique of intravenous saline injections under strict antiseptic precautions would be by no means easy, particularly in a hut; and that the risks from tetanus, air embolism, &c., in a dirty, dark hut would be too great to run. The matter was dropped for a time. Government has taken up the question of providing facilities for the treatment of cholera by the injection of hypertonic saline solution and is taking steps to arrange for instructions in this method of treatment being given to sub-assistant surgeons likely to be placed on cholera duty and to provide the necessary apparatus at the hospitals. Government believes that the number of medical men in Calcutta who are conversant with this system of treatment is at present small and that their charges are too heavy for the poorer classes to avail themselves of their services. Government has suggested that the Corporation should arrange on the outbreak of epidemics of cholera for the employment of a medical staff trained in this method, and having the necessary equipment for the treatment of the poor at their own homes. Government was informed of the apprehensions of the health officer; but it has consulted Sir Leonard Rogers, who approves of the proposal if properly trained men are employed, and has expressed readiness to give Corporation medical officers a practical training in his ward at the Medical College Hospital. In view of the advice given by Sir Leonard Rogers, Government has suggested that the experiment may be safely tried provided trained men are employed. The health officer has selected eight medical and vaccination inspectors, all possessing medical qualifications, though not L.M.S. or M.B., and the first batch is undergoing training, which will take about two or three weeks. The training has been arranged so as to cause as little dislocation of the ordinary work as possible. It is proposed to have at each of the district offices a set of the apparatus required for making the transfusion.

The Corporation received the report of their health officer with satisfaction.

CENTRAL MIDWIVES BOARD.—A meeting of the Central Midwives Board was held at Queen Anne's Gate Buildings, Westminster, on June 21st, with Sir Francis H. Champneys in the chair.—A letter was discussed from the general secretary of the Medical Defence Union asking the Board to consider certain communications of a more or less threatening nature received by several members of the Union from county medical officers of health as executive officers of the local supervising authorities in respect of professional attendance by recipients of the letters upon midwifery cases where uncertified women are engaged. The Board decided that the reply be that the Central Midwives Board has no jurisdiction over medical practitioners, uncertified women, or local supervising authorities. As regards the conduct of medical practitioners, the authority possessing jurisdiction is the General Medical Council. If reference is made to cases in which medical practitioners have been cited before it for "covering" uncertified women, it will be seen that a distinction is drawn by it between such women acting as monthly nurses and those acting as midwives. An uncertified woman who "habitually and for gain" attends women in childbirth otherwise than under the direction of a registered medical practitioner is liable, under the first section of the Act, to a fine not exceeding £10. Cases of genuine emergency are not included.—A letter was considered from the medical officer of the Lambeth Union Infirmary asking that his pupils may take one month's training out of the four required by Rule C. 1 (2) (*b*) in the gynæcological ward of the infirmary. The Board decided that the medical officer of the Lambeth Union Infirmary be informed that although the arrangements at that infirmary seem to the Board likely to prove of considerable value, the terms of the proviso of Rule C. 1 (2) apply to a candidate from a general hospital only and require a three months' course of nursing in a gynæcological ward in order to entitle the candidate to a reduction of one month in her midwifery training. The Board has consequently no power under this proviso nor under any other rule to grant the concession asked for.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben gold medal, which is awarded tri-annually, "for eminent services rendered to the public health," has this year been awarded to Surgeon-General Sir Alfred Keogh, G.C.B., Director-General, Army Medical Service, and the gold medal "for conspicuous services rendered to the cause of preventive medicine" to Dr. E. W. Hope, professor of public health in the University of Liverpool.

A Maternity Nursing Home at 13, Prince's-gate, London, S.W. 7, was opened by the Professional Classes War Relief Council early in 1915 for the benefit of the wives of professional men adversely affected by the war. Over 300 babies have been born therein. Applications for admission or for assistance in regard to maternity expenses at home should be made to the secretary. The work done has been most useful and is worthy of all support. Many medical men in various parts of the country have come across cases where the families of professional men have been terribly hit by the war, and in such circumstances this home has been a veritable blessing.

Major H. N. A. Taylor, R.A.M.C. (T.F.R.), has been called to the Bar by the Honourable Society of Gray's Inn.

## THE SERVICES.

### ARMY MEDICAL SERVICE.

Lieut.-Col. and Bt.-Col. E. M. Pilcher, D.S.O., to be temporary Colonel.

Col. O. R. Elliott and Col. (temp. Surg.-Gen.) M. William Russell, C.B., are retained on the Active List.

#### TERRITORIAL FORCE.

Lieut.-Col. A. R. Tweedie, Field Ambulance, to be temporary Colonel whilst holding the appointment of Assistant Director of Medical Services.

Capt. S. S. Greaves to be Deputy Assistant Director of Medical Services.

### ROYAL ARMY MEDICAL CORPS.

Temp. Lieut.-Col. A. Primrose, Canadian A.M.C., to be temporary Colonel while employed as Consulting Surgeon.

Temp. Major R. S. Pentecost, Canadian A.M.C., to be temporary Lieutenant-Colonel while commanding a Canadian Field Ambulance.

Temp. Major H. J. Stiles (Captain, R.A.M.C., T.F.) to be temporary Lieutenant-Colonel.

To be temporary Majors: Lieut.-Col. H. A. Moffat, D.S.O., South African M.C., F. S. Langmead, A. Goodall, M. B. Wright, and Capt. A. W. Nuthall, R.A.M.C., T.F., Temp. Capt. R. T. Herron, and Temp Capt. G. S. Strathy, Canadian A.M.C., Temp. Capt. F. R. Seymour.

To be temporary Captains: F. W. Milne, S. W. Allworthy, D. W. Woodruff, H. Robinson (late Captain R.A.M.C., T.F.), C. K. Wallace, and G. B. Fergusson.

To be temporary Captains whilst employed with the Huddersfield War Hospital: A. E. Hardy and R. H. Rigby.

W. E. Bracey, late temporary Captain, to be Honorary Lieutenant.

To be temporary Lieutenants: J. D. Lyle, G. C. Birt, R. Ward, R. C. Walker, W. Bannatyne, P. Moran, G. H. Culverwell, J. J. Tough, W. M. Menzies, G. Stewart, L. D. Cohen, A. J. Ballantyne, A. McEwan, J. A. Thom, G. F. Shepherd, E. M. Condy, D. T. Harris, L. C. Newton, T. C. Pocock, L. W. Keigin, D. T. Evans, A. B. R. Sworn, J. E. Kesson, D. B. Davidson, P. Stewart, W. Matheson, J. R. Hewetson, G. Y. Caldwell, A. B. Vine, H. A. Cecil, H. F. Overend, J. N. G. Nolan, A. F. Cowan, J. M. Wallace, H. W. Latham, J. J. W. Evans, C. J. S. Dismorr, P. H. Henson, J. Sullivan, H. Matthews, G. Deery, W. F. Erskine, O. May, G. A. Hoffmann, R. Alderson, W. P. Miles, J. Lambie, H. F. Ransome, H. O'H. O'Neill, C. W. P. Hillary, D. W. Roy, W. Taylor, H. G. F. Spurrell, J. Rusk, M. Shipsey, S. E. Atkinson, J. Avery, H. V. Mitchell, W. B. Wilson, R. Stansfeld, P. W. Hampton, R. Crawford, K. McK. Duncan, J. Ritchie, W. Anderson, W. Lilico, W. B. Wickham, J. Hunter, J. F. Bridge, J. Wylie, S. D. Craig, L. Hutchinson, B. S. Prior, E. O D. Graham, R. Duncan, H. O. West, E. W. Witney, S. H. White, C. S. Thomson, G. H. C. Lumsden, A. E. Knapp, Q. Madge, O. V. Payne, G. W. Curtis, W. W. Allison, E. Tate, J. D. Ferguson, A. J. May, A. B. Sykes, A. C. Renton, R. H. Thomson, J. M. Ahern, F. G. Ralphs, W. H. F. Eales, F. J. Willans, J. A. Wood, C. W. Forsyth, J. H. Iles, T. J. Lloyd, T. Clarke, H. R. Wright, F. W. Pollard, V. G. Best, T. Gillespie, W. E. Waymark, J. Williamson, S. Wood, G. W. Pope, J. K. Holland, J. P. Doyle, G. C. F. Roe, J. A. MacSweeny, A. R. Soady, R. E. G. Gray, J. M. Taylor, A. E. Leapingwell, H. T. P. Young, H. M. Roberts, J. P. Brennan, W. S. Sheppard, J. F. Peart, E. R. D. Maconochie, S. Brown, A. W. Brodribb, W. Weir, J. B. Aickin, J. A. Mearns, W. Mair, J. Steward, G. A. Pratt, A. H. B. Hartford, G. N. Kirkwood, R. Peart, W. W. Carlow, P. Talbot, J. C. Wootton, A. W. Ewing, W. Rotheram, A. Evans, A. C. Russell, J. Wilson, C. M. Ockwell, R. H. Hunter, J. Dunbar, T. R. Davey, T. P. Robertson, M. J. McCarthy, L. Welply, F. H. Fuller, N. E. Sampey, J. I. F. Knight, C. B. Ticehurst, F. W. MacKichan, R. Brown, D. MacGregor, J. Scott, F. H. Dodd, C. M. Ormsby, J. H. Jones, A. S. Mellor, C. L. Traylen, C. Murray, D. P. Lindsay, L. H. Werden, N. Gray, J. S. Wilson, C. L. Driscoll, H. E. Davison, A. H. Collins, E. E. Paget-Tomlinson, G. C. Anderson, G. Cooper, M. Briscoe, H. Graham, W. W. Horan, R. G. Smith, P. D. Hunter, S. A. Furlong, B. J. Cusack, E. A. Sanders, J. J. Delany, G. G. C. Adams, J. R. Munro, R. J. W. McKane, J. Ferguson, H. N. K. Kevin, D. D. Ritchie, R. J. Bentley, S. H. Sweet, H. Spurway, A. I. Shepherd-Walwyn, G. E. Thornton, W. S. Graham, I. L. MacInnes, J. K. Manson, J. Dalgliesh, J. L. Maynell, E. M. Niall, S. B. White, J. L. Reid, W. Tregea, W. B. Clarke, S. N. Galbraith, H. F. Fenton.

Officers relinquishing their commissions: Temp. Lieut.-Col. A. H. Carter (on account of ill-health); Temp Capts. C. T. Hilton, L. E. Williams, W. S. Newton, H. N. M. Puckle, H. C. Nelson, H. B. Smith, H. C. Martin, P. M. O'Sullivan, H. McKenzie, G. S. Cronk, L. A. Carr, W. L. Pedlow, F. W. Overholt, D. A. Macfarlane, J. V. Williams, C. F. W. Robinson, and E. Caudwell (on account of ill-health); Temp. Lieut. W. M. Thomas.

SPECIAL RESERVE OF OFFICERS.

To be Lieutenants: K. Masson, J. A. Martin, N. M. Lewis.

TERRITORIAL FORCE.

Capts. (temp. Majors) F. W. K. Tough, L. C. V. Hardwicke, P. W. Thompson, and J. O'Sullivan relinquish their temporary rank on ceasing to command a Field Ambulance.

Capt. S. S. Greaves is seconded whilst holding the appointment of Deputy Assistant Director of Medical Services.

Capt. (temp. Major) S. G. Webb relinquishes his temporary rank on alteration on posting.

Ian Ewart Macdonald to be Lieutenant.

Capt. (temp. Major) C. G. K. Sharp relinquishes his temporary rank on alteration in posting.

Major (temp. Lieut.-Col.) J. Bruce relinquishes his temporary rank on alteration in posting.

Lieut.-Col. A. R. Tweedie is seconded whilst holding an appointment as an Assistant Director of Medical Services.

Capt. (temp. Major) D. M. Spring relinquishes his temporary rank on alteration in posting.

Majors (temp. Lieut.-Cols.) H. Jones, H. A. Rudyard, A. W. Anderson, W. Bryce, J. H. Jones, J. Evans, C. W. Edwards, J. R. Benson, D. C. L. Orton, and Capts. (temp. Majors) J. Arthur, C. Cameron, G. H. Spencer, C. G. Murray relinquish their temporary rank on alteration in posting.

Capt. J. N. Robins is restored to the establishment on vacating the appointment of Deputy Assistant Director of Medical Services.

Capt. (acting Lieut.-Col.) J. W. Keay reverts to the temporary rank of Major on alteration in posting.

Capt. J. Blackwood to be acting Lieutenant Colonel whilst commanding a Field Ambulance.

Cyril Montague Smith to be Lieutenant.

Capt. (temp. Major) R. B. Carslaw is seconded for duty with a General Hospital, and to retain his temporary rank whilst so employed.

Capt. E. M. Jenkins to be temporary Major whilst in command of a Field Ambulance.

Capt. (acting Lieut.-Col.) R. A. Broderick relinquishes his acting rank on ceasing to command a Field Ambulance.

W. D. Dick to be Lieutenant.

Surgeon-Major J. E. Bates, from East Surrey Regiment, to be Major.

Officers seconded for duty with a General Hospital: Lieut.-Cols. T. Gowans, J. F. Dobson, G. P. Bush, C.M.G.; Majors H. B. Roderick, A. Cook, F. W. Burton-Fanning, R. A. Veale, D. J. Graham, F. D. Boyd, C.M.G., J. A. Andrews; Capts. W. B. Marshall, W. Tyson, H. A. Cookson, M. G. Foster, C. N. Chadborn, W. E. Alderson, T. S. P. Parkinson, J. D. Lickley, W. Seymour, A. Gough, W. Longley, F. J. Stansfield, M. J. Stewart, T. B. Mouat, J. H. Cobb, A. Young, H. C. Snell, W. R. Higgins, C. W. Sharpley, R. H. Fagge, R. Michell, A. A. S. Skirving, J. Eason, J. McC. Johnston, J. Gilchrist, J. Henderson, S. G. Webb, H. B. Whitehouse, A. R. Bearn, J. G. L. Mackay, A. L. Flemming, and W. B. Secretan.

INDIAN MEDICAL SERVICE.

The King has approved of the retirement of Colonel D. St. J. D. Grant.

# Parliamentary Intelligence.

## NOTES ON CURRENT TOPICS.

*Military Service (Review of Exceptions) Act.*

THE Select Committee of the House of Commons which has been appointed to inquire into the working of the Military Service (Review of Exceptions) Act, commenced taking evidence on Monday, July 2nd. Mr. SHORTT was in the chair. It is understood that the aim of the Committee is to be in a position to report to the House in the early days of August, and for that purpose the intention is to sit four days a week. A very considerable body of evidence on behalf of men who have come under the operation of the Act has been offered to the Committee.

Brigadier-General CAMPBELL GEDDES, Director of Recruiting, was the first witness on Monday, and he described the necessity which, in the opinion of the War Office, existed for introducing a review of the exceptions from military service. He went on to say that a special branch had been created at headquarters under Colonel GALLOWAY, the senior physician at Charing Cross Hospital, for carrying out the arrangements of the Medical Boards throughout the country. Colonel GALLOWAY had inspected these arrangements and had advised their members as to the standards of fitness which should be applied to the men who came up for medical examination. The result had been that a much more uniform standard had been attained and very few men were now called up for the Army who were unsuitable for the work which was allotted to them. He was prepared to anticipate a 1 per cent. of error, but included in it there would be cases of impersonation. The War Office, he mentioned, had several definite cases where after a man had been classified by a medical board it happened that a hopelessly unfit man would report in his stead on the issue of the calling up notice. There had been a good deal of "doping," and for that reason re-examination became necessary. As to certificates given to men by private medical practitioners, he said that they had been valuable guides to medical boards in many cases, but the difficulty sometimes had been the absence of means of knowing that the man to whom the private certificate related was the man before the board. The witness also pointed out that the Army was in need of men of the lower categories. There was no more chance of a man classified as C 3 seeing service in the trenches than if he remained in civilian employment.

*Sir A. Keogh's Evidence.*

On Tuesday, July 3rd, Sir ALFRED KEOGH, the Director-General of the Army Medical Service, was the witness. He made a statement showing the functions which were exercised by his department. He said that it was not until the time of the Derby campaign that it was possible to establish a fully organised system for the medical examination of recruits. At that time he had suggested that medical boards should be set up for the examinations. In order to secure that these boards should have Army experience to guide them, it had been considered that where possible a military medical officer should be appointed president. All the medical boards had to do was to report as to the physical condition of the men put before them, and there was ample room for difference of opinion as to what category the man should be placed in. Medicine was not an exact science. It was for this reason that boards were established in order that decisions of great importance should not be made on the opinion of one practitioner. He emphasised the special character of the work of passing men for the Army. It involved a knowledge of the daily life of the soldier. In peace time a man was recruited for a special branch, and it was necessary for the examining medical officer to know something about the daily life of the soldier in that branch. Although the physical standards for the service were the same, the amount of weight to be laid on any specific disability depended on the branch of the service for which the man was accepted. When the war broke out men were taken to local practitioners for medical examination. These practitioners could not possibly know the requirements of the service, and the consequence was that a large number of men were recruited who in peace time would not have been accepted. Errors arose from the want of knowledge of the Army, and many of the differences of opinion which had been found to exist were quite legitimate differences as between medical men. Very good medical men might well differ as to the category in which a man should be placed. Sir ALFRED KEOGH went on to say that the best recruiting medical officer could not possibly examine more than 40 recruits a day without doing injustice to himself and the service. He had appointed a body of medical inspectors to try to obtain common standards. The president of a medical board could not override the opinion of

three or four other members. He did not appoint the civilian medical boards. That was done by the various commands. He would furnish particulars which would show the number of men who had been in hospital with less than three months' service, but he could not give the number of men who had been previously rejected before being accepted by the Army.

Mr. COCHRANE: It is not possible for men to be classified by the president of the board alone?

Sir A. KEOGH: Most emphatically it would be quite contrary to the custom of the service. He did not think that there had been a general lowering of the standards. The medical department did not fix standards, but interpreted standards. The military authorities told that department what they required the men to do, and the medical men tried to translate that into physical terms. The responsibility for the medical boards was on the deputy directors of medical service in the commands. The recruiting officers were responsible for summoning men to undergo medical examinations.

*Evidence of Colonel James Galloway.*

Colonel JAMES GALLOWAY gave evidence on Wednesday, July 4th. He stated that before assuming his present duties as inspector of medical recruiting boards he had spent considerable time as consulting physician to the First and Second Armies in France. He was senior physician in Charing Cross Hospital. In his visits of inspection he had visited nearly all the medical recruiting boards in the country. Some 139 or 140 recruiting medical boards were now at work in England, Scotland, and Wales. These varied in efficiency within wide limits. They were of various types. Perhaps the best of these boards were those which centred round a retired R.A.M.C. officer. These established themselves at the depôts of the various regiments, and where there was an officer who had retired young, say with the rank of major, and had identified himself with the civilian population, the board which formed round him was generally very efficient. Other boards had arisen more rapidly. For instance, the D.D.M.S. of a command, knowing he had to establish a board, would chose some officer and send him to establish it on his own initiative. The best boards of this type were chosen in collaboration with the local medical profession, and he thought it advantageous to act in coöperation with the Local Medical War Committees in the formation of boards. There was still another sort of board which he had come across, particularly in the Eastern Command. The president and the examining officers seemed to be military men, but on inquiry he often found that the majority of them were Territorial medical officers or civilian medical men holding temporary commissions. Colonel GALLOWAY spoke of the extreme difficulty experienced in many instances in obtaining suitable accommodation for the boards, and also of the composition of the boards themselves. A president and four members was the most suitable size. A good president was very important. He required training and a great deal of tact and prudence and a certain capacity for organisation. It was thought desirable that on the whole the president should be an officer who knew from experience what the soldiers had to do in the field. In his own view it was the better plan to get as presidents of the boards men who had Army experience, but were not too far removed from the medical profession so far as years and experience were concerned, and were able to know the requirements of the forms and were able to keep a certain amount of discipline and order in the proceedings of the board. The members of the boards were preponderatingly civilian practitioners. They were often the local doctors. In certain commands, where the president was in contact with the Local Medical War Committee, a panel of local practitioners was arranged. It was most essential that the president should not be working in his own locality. Colonel GALLOWAY spoke of the difficulty in placing men in the different categories. The margin between one class and another was often very narrow and there was room for legitimate disagreement. What had struck him during his inspection had been not numerous mistakes but the organisations which had grown up in such a short time and the general competency of the work performed by the boards. He had heard of certificates being torn up, but he had never seen anything of the sort himself. The certificate of a family doctor might be much more helpful to a board than even the certificate of a specialist who had examined a man.

The Committee adjourned.

*Mesopotamia Commission.*

It has been arranged that a day will be devoted by the House of Commons next week to a discussion of the Mesopotamia Commission's report. In the meantime a good many questions have been asked about it, but Ministers have been inclined to request Members to await a debate. On Wednesday, July 4th, both the Chancellor of the Exchequer and the Secretary of State for India declined to assent to the publication of the evidence taken before the Commission.

Lord HARDINGE OF PENHURST who occupied the position of Viceroy during the events of Mesopotamia covered by the report, has made a long statement on his position in the House of Lords. He made some references to the medical arrangements, and stated that he and the Commander-in-Chief in view of the rumours which reached them decided on the appointment of the Vincent-Bingley Commission. He remarked that the heavy demands made on India for the provision of ambulances and hospitals and their personnel in England, France, Mesopotamia, Egypt, and East Africa soon exhausted an organisation which had never been intended or prepared for operations out of India, and he pointed out that his telegram of Oct. 21st, 1914, a date within three months of the outbreak of war, indicated that the supply of hospital assistants and permanent hospital staffs had already been exhausted, but that every effort was being made to improvise new personnel. By making a great effort many more ambulances, hospitals, and medical personnel were despatched from India to the various theatres of war during the course of 1915. He pointed out that even before the despatch of the Vincent-Bingley Mission he took every possible means to improve the medical situation. It might be difficult for people in England to realise the inherent difficulties in the personal supervision by the Viceroy over the medical arrangements in a theatre of war so far distant from him as Mesopotamia was from India.

## HOUSE OF COMMONS.

WEDNESDAY, JUNE 27TH.

*Infant and Maternity Welfare in Ireland.*

Answering Mr. BYRNE, Mr. DUKE (Chief Secretary for Ireland) said: The Government proposals in regard to maternity and child welfare were communicated to the county, borough, and urban district councils and made public in June last year, and to rural district councils last month.

THURSDAY, JUNE 28TH.

*Prisoners of War.*

Replying to questions relating to the negotiations by British and German delegates at The Hague in respect to questions connected with the treatment of prisoners of war, Mr. BONAR LAW (the Chancellor of the Exchequer) said: The British delegates are only empowered to discuss questions relating to prisoners of war. These include the resumption of the repatriation of combatant and civilian prisoners under existing agreements; the extension of the existing agreements for the repatriation of combatant and civilian prisoners; the transfer of combatant prisoners of war to other neutral countries in addition to Switzerland; the internment of civilian prisoners of war in neutral countries; the more expeditious and satisfactory delivery of parcels to prisoners; the punishment of prisoners; reprisals on prisoners; the delay in reporting and failure to report the capture of prisoners; and the removal of British merchant officers from combatant officers' camps. The British delegates are not debarred from discussing other questions relative to prisoners of war which may be raised by the German delegates, but, in any case, such conclusions as may be arrived at will be subject to ratification by His Majesty's Government.

*The Traffic in Morphine.*

Sir WILLIAM COLLINS asked the Home Secretary whether Regulation 40 B in the Order of Council, No. 501, of July 28th, 1916, which restricted the traffic in opium and cocaine to that required for medicinal purposes applied also to morphine, the principal alkaloid of opium; and, if not, whether, in view of the abuse to which that drug was liable, he would bring to the notice of the Privy Council the desirability of extending the Order so as to include morphine, its salts and preparations.—Sir G. CAVE replied: Regulation 40 B does not apply to morphine. The Regulation is an emergency provision made under the powers of the Defence of the Realm Act, and I am not at present aware of any special grounds arising out of the present emergency for exercising those powers in regard to morphine. The inclusion of opium in the Regulation was necessary in order to put a stop to the illicit export of opium in contravention of the Proclamation.

Sir WILLIAM COLLINS asked the Foreign Secretary whether any communications had taken place with the Japanese Government in reference to the imports of morphine of British manufacture entering Japan and passing thence into China; and whether, seeing that Japan, China, and Great Britain were signatories to the International Opium Convention of 1912, which included morphia, steps would be taken with a view to restrict the traffic in that drug to legitimate and medical purposes only as provided in the convention.—Mr. BALFOUR wrote in reply: His Majesty's Ambassador at Tokio has been consulted in this matter, but the Japanese Government has not yet been actually approached. The other departments concerned are at present considering what steps can properly be taken to restrict the traffic in morphine.

*An Amendment of National Insurance Acts.*

Mr. TYSON WILSON asked the representative of the National Insurance Commissioners whether he proposed to bring in a Bill to amend the National Insurance Acts on the lines recommended by the Ryan Committee.—Sir E. CORNWALL replied: The matter is now under consideration, and I hope it will be possible to introduce at an early date an amending Bill of a non-controversial nature.

*Health of Munition Workers.*

In the course of a comprehensive speech dealing with the activities of the Munitions Department Dr. ADDISON (Minister of Munitions) said: We have received much help from the branches of the Ministry which have special charge of the welfare and health of munition workers. The Health of Munition Workers Committee, under Sir George Newman, has helped us a great deal in this matter. I should hope that some of the reports which it has published and we have adopted will lead to a permanent improvement in our methods of industry. More than 600 firms have appointed supervisors whose sole duty is to promote the welfare of their workers, and great benefit has resulted in different directions. They deal with such questions as food, clothing, light, ventilation, rest, and so forth. I am sorry to say that last year the problems arising out of the handling of T.N.T. and other poisonous explosives became acute and I appointed a special committee, under the chairmanship of Dr. W. M. Fletcher, secretary of the Medical Research Committee, to investigate them and make recommendations. The efforts of this committee, in conjunction with the filling department, have resulted in the application of suggestions which have been accompanied by an enormous diminution of the cases of illness. We have found here, as we have found often enough before, that the problems of prevention, when understood, are easier than those of cure.

TUESDAY, JULY 3RD.

*Funds for Treatment of Tuberculosis.*

Sir G. GREENWOOD asked the representative of the National Insurance Commissioners whether he was aware that the funds in the hands of the Commissioners were hardly sufficient to enable them to meet the just claims upon them; whether it was anticipated that by reason of the war those claims would be very largely increased; and whether, in these circumstances, he would consider the desirability of applying the moneys provided by Parliament primarily for the purpose of defraying the expenses of sanatorium benefit, under Section 16 of the National Insurance Act, 1911, for such purpose in preference to expending them on painful experiments upon living animals.—Sir E. CORNWALL replied: I am aware that funds available for the treatment of tuberculosis in this country need to be increased and that by reason of the war this need has become more urgent, but I have no doubt that whatever provision is made for this purpose, Parliament would require that provision should also be made for continuing the essential work carried on by the Medical Research Committee in the interest of the health of the community.

# Appointments.

***Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.***

To be Certifying Surgeons under the Factory and Workshop Acts: BREW, R. V. (Chew Magna District of the county of Somerset); KHAMBATTA, J. C., M.B., Ch.B. Edin. (East Wemyss District of the county of Fife); WHITWORTH, W. C., M.R.C.S., L.R.C.P. Lond. (St. Agnes District of the county of Cornwall).

# Vacancies.

***For further information regarding each vacancy reference should be made to the advertisement (see Index).***
***When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.***

ABERGAVENNY, MONMOUTH COUNTY ASYLUM.—Temporary Assistant Medical Officer. Salary £7 7*s.* per week, with board, &c.

BARNSLEY, BECKETT HOSPITAL AND DISPENSARY.—House Surgeon. Salary £250 per annum, with board, &c.

BIRKENHEAD BOROUGH HOSPITAL.—House Surgeon. Salary £250 per annum and war bonus, board, &c.

BOURNEMOUTH, ROYAL NATIONAL SANATORIUM FOR CONSUMPTION AND DISEASES OF THE CHEST.—Resident Medical Officer and Clinical Tuberculosis Officer. Salary for joint appointments £430, with board, &c.

BOURNEMOUTH, ROYAL VICTORIA AND WEST HANTS HOSPITAL, Boscombe Branch.—Resident Medical Officer. Salary £300 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.

BURTON-ON-TRENT INFIRMARY.—Resident House Surgeon. Salary £250 per annum, with board, &c.

CHILDREN'S INFIRMARY, Cleveland-street, London, W.—Assistant Medical Officer. Salary £250 per annum, with board, &c.

DEVONPORT, ROYAL ALBERT HOSPITAL.—House Surgeon, unmarried. Salary £150 per annum, with board, &c.

DIDWORTHY, S. BRENT, DEVON AND CORNWALL SANATORIUM FOR CONSUMPTIVES.—Locum Tenens for four weeks. 6 guineas per week, hospitality, &c.

DURHAM COUNTY COUNCIL.—Female Assistant School Medical Officer. Salary £300 per annum, &c.

GRANGE-OVER-SANDS, WESTMORLAND SANATORIUM AND HOME.—Locum Tenens Assistant Medical Officer for three weeks. Salary 7 guineas per week, with board, &c.

GREENWICH UNION INFIRMARY AND WORKHOUSE.—Assistant Medical Officer, unmarried. Salary £200 per annum, with apartments, rations, &c.

INSURANCE COMMITTEE FOR THE COUNTY OF LONDON.—Medical Adviser.

ITALIAN HOSPITAL, Queen-square, London, W.C.—House Surgeon for six months. Salary £150 per annum, with board, &c.

LIVERPOOL EYE AND EAR INFIRMARY, Myrtle-street.—Female House Surgeon.

LIVERPOOL ROYAL INFIRMARY.—Male and Female Clinical Assistant for Treatment of Venereal Diseases. Male Assistant two hours three days a week. Female Assistant one day a week. Salaries £250 for Male and £100 for Female Officer.

MACCLESFIELD GENERAL INFIRMARY.—House Surgeon. Salary £200 per annum, with board, &c.

MANCHESTER CHILDREN'S HOSPITAL, Pendlebury, near Manchester.—Two Female Resident Medical Officers, unmarried. Salary at rate of £200 per annum.

MANCHESTER COUNTY ASYLUM, Prestwich.—Locum Tenens. Salary £7 7*s.* per week, with board, &c.

QUEEN CHARLOTTE'S LYING-IN HOSPITAL, Marylebone-road, N.W.—Assistant Resident Medical Officer for four months. Salary at rate of £60 per annum, with board, &c.

QUEEN MARY'S HOSPITAL FOR THE EAST END.—House Surgeon.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Physician for six months. Salary £100 per annum, with board, &c.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—House Physicians. Salary £50 per annum, with board, &c.

SHEFFIELD ROYAL INFIRMARY.—House Physician. Salary £120 per annum, with board, &c.

SOUTH LONDON HOSPITAL FOR WOMEN, South Side, Clapham Common, S.W.—Female House Physician and House Surgeon for six months. Salary at rate of £100 per annum each, with board, &c.

STAFFORDSHIRE, WOLVERHAMPTON, AND DUDLEY JOINT COMMITTEE FOR TUBERCULOSIS.—Holiday Locum Tenens. Salary 8 guineas per week.

STOKE-ON-TRENT COUNTY BOROUGH.—Female Assistant Medical Officer, in connexion with Maternity and Child Welfare Work, &c. Salary £350 per annum.

SUNDERLAND COUNTY BOROUGH.—Temporary Tuberculosis Medical Officer. Salary at rate of £500 per annum.

THROAT HOSPITAL, Golden-square, W.—Two Resident House Surgeons. Salaries £100 per annum, with board, &c.

WALSALL EDUCATION COMMITTEE.—Temporary School Medical Inspector. Salary at rate of £400 per annum.

WEST HAM UNION INFIRMARY, Whipps Cross-road, Leytonstone, E.—Resident Assistant Medical Officer. Salary £300 per annum, &c.

WOLVERHAMPTON AND MIDLAND COUNTIES EYE INFIRMARY.—House Surgeon. Salary £150 per annum, with board, &c.

YORK, CITY OF.—Temporary Tuberculosis Officer. Salary at rate of £500 per annum.

# Births, Marriages, and Deaths.

## BIRTHS.

JONES.—On July 2nd, at Coleford House, near Bath, the wife of Captain Philip T. Jones, R.A.M.C., T.F.R., of a daughter.

## MARRIAGES.

ALEXANDER-MORGAN.—On June 27th, at Stockton Heath Parish Church, Cheshire, by the Rev. H. V. Pigot and Rev. J. Collins, Richard Charles Alexander, M.B., F.R.C.S.E., temporary Captain, R.A.M.C., to Marjorie Linda Morgan, third daughter of W. Arthur Morgan, of Cork-street, London, W., and Cardiff.

DICKENSON—GOSTLING.—At St. Olave's Church, Staff-Surgeon G. O. M. Dickenson, M.B., R.N., to Mary Ella, elder daughter of Dr. J. H. and Mrs. Gostling, Bootham, York.

RICHES—RIDER.—On June 25th, at St. Mary's Church, Felpham, Major R. G. Riches, R.A.M.C., to Nellie Grace, daughter of William C. Rider and Mrs. Rider, of Felpham, Sussex.

## DEATHS.

BIRDWOOD.—On June 28th, at Windsor-road, Ealing, George Christopher Molesworth Birdwood, K.C.I.E., C.S.I., M.D., aged 86.

BROWNE.—On June 27th, at Kirby View, Caldy, Edgar Athelstane Browne, F.R.C.S. Edin., M.Ch. Liverpool, aged 75 years. Formerly of Rodney-street, Liverpool.

COTTON.—On June 28th, at his residence, Highland House, Camden-road, N., Thomas Cotton, M.D., M.R.C.S., L.R.C.P., aged 90. No flowers, by request.

PIGGOTT.—On June 26th, suddenly, at Sutton Veny, Frederick Cecil Holman Piggott, M.D. Cantab., temporary Captain, R.A.M.C., of Teign Royd, Teignmouth, aged 57.

*N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.*

# Notes, Short Comments, and Answers to Correspondents.

## EGYPTIAN REMEDIES FOR BITES AND STINGS.

AN important relic from ancient Egypt throwing light upon the medical knowledge of primitive times is the inscribed slab known as the Metternich Stele. It gives magic formulæ protective against bites of venomous animals, and, in case the injury had been suffered, remedial incantations and medical means of cure or alleviation. In Egypt medicine and magic were closely connected, being studied jointly in a college and clinic called "The Double House of Life." Of its curriculum we have some particulars in an inscription now in Rome. The medical measures for use in the case of bite or sting were as follows:—

> The person bitten, if unconscious, was examined, and if the wound's site was uncertain the body was smelt over. It would seem that the scent of the breath was indicative of the type of reptile inflicting the injury. Once the puncture was located the surgeon sucked the wound, spitting away any matter withdrawn. This process is frequently advised, and as blood is alluded to in all of them it evidently was the practice to make an incision near the puncture to abstract venom commencing to invade the arteries. If the sting was upon a compressible member, that was tightly compressed by the fingers and massage applied with the view of squeezing out the poison. Ligatures were employed to stop the circulation and retard infection. These were of a special kind, of which the physician had a supply, it being important they should be inscribed with magic formulæ. Bandages had such texts upon them, or upon labels attached. One remedy mentioned is a mixture of flour and salt. If the contagion had produced coma, the patient was violently shaken, and various means tried to awaken him. These included mesmeric passes and incantations, which were reported to have been successful when Isis cured Horus from the bite of the animal evil deity, Set.

It will be seen that the medical measures used did not amount to much. No antidote of any efficiency is advised. Therefore the interest of this inscription lies in its evidence of the meagreness of medical knowledge at the time when it was originally written. This may be very far back indeed, for it professes to be a copy of a very ancient and almost perished text found in a temple.

The intimate connexions between Egyptian magic and medicine are demonstrated by the dual title of physician and magician being assigned to the same person. The ancient hieroglyphs, or pictographs, for physician are very significant, being a seated man apparently with shaven head as became a member of some religious association; a pot or vase; and a barbed arrow; also a small vertical line. The jar evidently denoted the receptacle for drugs or salves, whilst the dart signified the poignant pain the medicine-man relieved, or a wound to be healed.

## THE CHILDREN'S COUNTRY HOLIDAY FUND AND EAST-END AIR-RAIDS.

WHILE the immediate effects of air-raids are obvious the remote effects on the mind and body of the child must not be lost sight of. The suggestion that as many children as possible from North Street school area, Poplar, the school which suffered most severely in the East-End raids, should be sent away to the peace and quiet of the country has much to commend it. The Children's Country Holiday Fund is appealing for donations to this end and at the same time asking residents in the western counties within 150 miles of London, who may be in a position to secure suitable cottage accommodation, to communicate with the secretary at 18, Buckingham-street, Strand, W.C. 2.

## A HIGH-FREQUENCY GENERATOR.

THE Sterling Corporation, Ltd., of 72, Wigmore-street, have shown us a form of high-frequency generator that has some obvious advantages. Though weighing only 5 lb., it is quite capable of giving all forms of high frequency in applications for local conditions, as distinguished from diathermy. As these local applications constitute the chief value of the high-frequency apparatus, weighing ordinarily almost as many hundredweights as this apparatus weighs in pounds, it will be seen that we have here a great technical advance on the apparatus hitherto available. Furthermore, the apparatus can be used in the patient's house with any current and any voltage as usually supplied. Where no main current is available a special form is supplied to work from batteries. A very complete series of vacuum and other electrodes are obtainable, and these, as well as the apparatus itself, are sold at a reasonable price. The vendors make some claim for the apparatus that it is a violet and ultra-violet ray generator and possesses special advantages on this account. We venture to doubt if these claims can be substantiated in practice, and they are unnecessary, seeing that without them the apparatus is well worthy of the attention of those interested in ordinary applications of high-frequency electricity.

# Medical Diary for the ensuing Week.

## LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

**POST-GRADUATE COLLEGE**, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

**ROYAL INSTITUTE OF PUBLIC HEALTH**, Lecture Hall of the Institute, 37, Russell-square, W.C. 1.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY.—4 P.M., Lecture XIII.:—Prof. D. N. Paton: Feeding a Nation. Followed by a discussion.

## EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

*Offices:* 423, STRAND, LONDON, W.C. 2.

## MANAGER'S NOTICES.

### TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C. 2, are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and *not* to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

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## METEOROLOGICAL READINGS.

*(Taken daily at 8.30 a.m. by Steward's Instruments.)*

THE LANCET Office, July 4th, 1917.

| Date. | Rainfall. | Solar Radio in Vacuo. | Maximum Temp. Shade. | Min. Temp. | Wet Bulb. | Dry Bulb. | Remarks. |
|---|---|---|---|---|---|---|---|
| June 28 | ... | 112 | 57 | 59 | 61 | 65 | Overcast |
| ,, 29 | 1·90 | 80 | 59 | 56 | 58 | 68 | Raining |
| ,, 30 | 0·04 | 90 | 60 | 51 | 52 | 56 | Cloudy |
| July 1 | ... | 113 | 69 | 52 | 57 | 59 | Cloudy |
| ,, 2 | ... | 114 | 74 | 50 | 54 | 55 | Overcast |
| ,, 3 | ... | 120 | 78 | 54 | 60 | 67 | Fine |
| ,, 4 | ... | 70 | 63 | 57 | 56 | 60 | Overcast |

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

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